THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. V. No. 89—7th YEAR.] LONDON, MARCH 18, 1856. [Subscription per Ann. 15s. in Advance 18s. Credit. Price 8d. Unstamped.

CANNEL COAL.

RAMSAY'S NEWCASTLE CANNEL was discovered by the Advertiser in 18 8. Cannel Coal was then little used in London: after surmounting much opposition, it has become the principal Cannel Coal used in the Metropolis, and has greatly assisted in improving the London gas. Its joint products of gas of high illuminating power, and coke of good quality, make it one of the most economical coals known. It is used by all the London Gas Companies, as well as by many Provincial and Foreign. The Crystal Palace was lighted from it in 1851, and the Post-office, Bank, and *Times* Office, are at present.

FIRE-CLAY RETORTS.

FIRE-BRICKS of all descriptions. Manufactory established in 1804.

RAMSAY'S GARESFIELD COAL and COKE.

Bone and Artificial Manures of all kinds.

Address G. H. RAMSAY, Offices, Broad-chare, Newcastle-on-Tyne.

April 27, 1854.

PADDON AND FORD,

PATENT GAS METER & APPARATUS WORKS, GRAY'S-INN-ROAD, LONDON,

Manufacturers of WET and DRY GAS METERS, STATION METERS, GOVERNORS, EXPERIMENTAL APPARATUS, GAS STOVES, and LANTERNS.

Contractors for the erection or alteration of Gas Works; and every description of Apparatus required in Gas Works supplied.

ORMSKIRK GASLIGHT COMPANY.

WANTED, a Man to undertake the Manufacture of Gas, the Care of the Plant, the Care of the Consumers' Meters and the Repairs of them; the Laying of Mains and Services throughout the Town, and to fill up his time in Fitting.—Applications, stating Salary expected, with Testimonials, to be sent, post free, to Mr. L. WRIGHT, Secretary to the Company, ORMSKIRK, on or before the 31st of March.

JOHN BRYAN,

GENERAL COMMISSION AGENT,

1, SANDHILL,

NEWCASTLE-ON-TYNE.

Contracts made for all kinds of Cast and Wrought Iron Gas and Water Apparatus, Clay Retorts, Fire-Bricks, Coals, &c.—Prices, and Lists of Freights and Carriage, sent on application.

THROCKLEY CLAY-WORKS, NEWCASTLE-ON-TYNE.

WILLIAM STEPHENSON and SON

Beg to intimate that they have erected extensive Works for the MANUFACTURE of every description of GAS RETORTS, FIRE-BRICKS, LUMPS, &c.

The Clay having been proved (by analysis and the application of extreme heat) of FIRST-CLASS quality, they can confidently recommend it.

UNEXCEPTIONAL REFERENCES given, and orders NEATLY and QUICKLY EXECUTED.

COWEN'S PATENT FIRE CLAY RETORTS.

JOS. COWEN and CO.,

BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire Clay Retorts in the United Kingdom; and orders for Fire Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their works as above.

Also, owners of BLAYDON BURN COLLIERY, from which "COWEN'S CANNEL COAL," extensively used in Metropolitan and other Gas Works, and "COWEN'S GARESFIELD COAL," are obtained. From the latter, "COWEN'S GARESFIELD COKE" is made, the superior quality of which is well known.

Coal and Coke Office, Quay-side, NEWCASTLE-ON-TYNE.

JOHN RUSSELL AND CO.,

THE OLD TUBE WORKS,

CHURCH HILL, WEDNESBURY,

STAFFORDSHIRE,

and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Boilers; have been awarded the FIRST PRIZE in the Great Exhibition of Paris for these Articles.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

The eminent Mr. Perkins confines himself altogether to the use of John Russell and Co.'s Tubes in High-Pressure Patents.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

VOL. IV. of the JOURNAL of GAS-LIGHTING for 1855, is now ready for delivery, price 15s., bound in cloth and lettered. Cloth backs for binding, 2s. 6d. each. A few copies of Vols. II. and III. are also still on sale.

W. B. KING, 11, Bolt Court, Fleet Street.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR,

begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents:

JAMES LAWRIE & CO.,

COUSIN LANE, UPPER THAMES STREET.

TO LOCAL BOARDS OF HEALTH, CORPORATIONS, IMPROVEMENT COMMISSIONERS, AND OTHERS.

MR. W. J. WARNER, General Gas-METER INSPECTOR, is prepared to undertake the Periodical Testing of Meters in all parts of the Country. For terms apply to Mr. WARNER, No. 26, VILLIERS STREET, Adelphi, London.

TO GAS COMPANIES.

TO be Sold, Four Dry Lime Purifiers, each 13 ft. 2 in. long, by 4 ft. 2 in. wide, inside, divided into Three Compartments, with Three Tiers of Trays in each. These have only been in use since 1847, and are removed to make room for larger ones.—For particulars apply to the MANAGER, Gas Works, CARLISLE.

March 12, 1856.

DRY LIME PURIFIER.

TO be Sold, by Private Contract, a DRY LIME PURIFIER, in good condition, 8 ft. square, divided into Four Compartments, with Valve in the centre; the Inlet and Outlet Pipes of 4 in. diameter. Is now ready for inspection at the BEVERLEY Gas Works.

March 6, 1856.

TO BRASS FINISHERS, &c.

LACQUER from Methylated Spirit, sold by C. LLOYD, 28, Upper North Place, Gray's Inn Road, LONDON—12s. per gallon, 3s. 6d. per quart, or 1s. per half-pint, any colour.

Wholesale House for Gas Chandeliers, Pipes, &c. &c.

TO WHOLESALE AND MANUFACTURING HOUSES.

WANTED, by the Advertiser, a Re-engagement as CLERK or TRAVELLER. Thoroughly acquainted with the Gas-fitting Trade, and equal to any Counting-house duties. First-class References.—Address, J. G., 14, Charlwood Place, PIMLICO.

JAMES RUSSELL AND SONS,

WEDNESBURY, STAFFORDSHIRE, and 81, UPPER GROUND STREET, BLACKFRIARS, LONDON,

PATENTEES, INVENTORS, AND FIRST MAKERS OF

WROUGHT-IRON GAS TUBING,

commencing from the *earliest* introduction of Gas Lighting into this country.

Manufacturers of every size and description of Wrought-iron Tubes and Fittings, from one-eighth up to seven-inch internal diameter, for Gas, Steam, or Water.

PATENTEES AND MANUFACTURERS OF THE

LAP-WELDED FLUES,

for Marine, Locomotive, and Stationary Boilers.

Inventors and Manufacturers of

IMPROVED STEAM AND GAS COCKS,

in Iron or Gun Metal, from three-eighths to six-inch bore. Manufacturers of every description of hand-screwing

STOCKS, DIES, AND TAPS,

for Gasfitters and Engineering purposes.

Manufacturers of Coils, for hot water and other purposes; Casing of all sizes, with flush joints, for Well-sinkers; Blasting Tubes; Buffer Tubes for Railway Carriages; Tubes for Roller Beams; Spindles, Shafts, Pendulums; Hydraulic Presses, Core Bars, Steam Gauges, &c. &c.

JAMES RUSSELL and SONS beg to call the attention of Engineers, Builders, Water Companies, and others, to their

PATENT ENAMELLED TUBES,

which preserve water or other liquids conveyed by them in a perfectly limpid condition; whilst the Enamel itself is as pure as the finest Porcelain, possessing the rare recommendation of being entirely free from any noxious ingredient in its composition.

Lists, Estimates, &c. &c., forwarded on application; orders, from 10 to 100,000 feet of gas tube, executed at twelve hours' notice if required; and quality may be safely relied upon, as all goods are most carefully tested before leaving the Works.

JAMES RUSSELL and SONS have great pleasure in calling attention to the annexed award:—

"EXHIBITION OF THE INDUSTRY OF ALL NATIONS, NEW YORK.

"Office: No. 6, Charing-cross, London, April 4, 1854.

"Gentlemen,—I have much pleasure in informing you that the Jury has awarded to your firm 'HONOURABLE MENTION FOR LAP-WELDED IRON TUBES.' May you at full liberty, if you deem it likely to promote your mercantile advantage, to affix to these articles, during the season 1854, a card whereon this Award is printed, with your prices, with name of agent, &c.—I am, gentlemen, your obedient servant,

"JOHN H. DOWN, Secretary.

"Messrs. JAMES RUSSELL and SONS, Wednesbury, STAFFORDSHIRE."

JOURNAL OF GAS LIGHTING ONE PENNY NEWSPAPER

WILLIAM PARKINSON & CO.
(Successors to the late Samuel Crosley),
COTTAGE-LANE, CITY-ROAD, LONDON,

Beg most respectfully to announce that, in addition to the continued manufacture of GAS METERS, they manufacture Meters for measuring Water, Spirits, &c. (commenced under Patent, in 1843, by the late Mr. William Parkinson).

N.B. These Meters are as simple and durable as the Gas Meter, and as correct as that instrument under the most careful manipulation.

ON SALE,

TWO Sets of Purifiers, each consisting of Four Purifiers, with Centre-Valve. The Purifiers of one set are each 4 ft. square, and of the other, each 6 ft. square. The 6 ft. set have only been a short time in use: they are parted with because the Company have recently constructed more extensive apparatus.

For further particulars apply to the MANAGER of the Wigan Gas Works, or to Mr. ROPS, Consulting Engineer, PRESTON.

SOUTH METROPOLITAN GASLIGHT AND COKE COMPANY.

NOTICE is hereby given, that an ORDINARY MEETING of the PROPRIETORS of this Company will be held at the LONDON TAVERN, on Wednesday, the 9th day of April next, at Two o'clock precisely, to receive the Directors' Report and the Accounts of the Company for the half year ended the 31st of December last; to declare a Dividend for the same period; and to elect one Director and one Auditor, in the place of Mr. Alderman Farncomb, Director, and William Miller Christy, Esq., Auditor, who retire from office agreeably to the Act of Incorporation; but, being eligible, offer themselves for re-election.

Any Proprietor intending to become a Candidate for either of these offices must give notice in writing at the Office of the Company at least 14 days previously to the day of election.

By order of the Directors,
THOMAS LIVESEY, Secretary.
Gas Works, Old Kent Road, March 15, 1856.

RETORT AND BOILER SETTING.

FREDERICK SIMMONDS, Sen.,
No. 11, WELLINGTON STREET, OLD FORD ROAD,
Thirty years RETORT SETTER to some of the leading London and Provincial Gas Companies, to whom he can refer, begs leave to draw attention to his economical mode of Setting Clay or Iron Retorts, &c.

F. S. will engage to provide all materials and labour, or labour only.

J. JONES, Iron Merchant, 6, Bankside, has long been known to sell the following Castings at prices lower than any other house in London:—Socket and Flange Pipes, Bends, Branches and Tees, Syphons, Lamp-posts, Rain-water Pipes, &c.; also, Hot Water Pipes, Elbows, Tees, Cylindrical and Saddle Boilers, and every Fitting for the same. Drawings and Prices of the above on application to J. JONES, Iron Bridge Wharf, 6, BANKSIDE, near the Southwark Iron Bridge.

FOR SALE,

A Dry-Lime Purifier, 8 feet square, in Four Compartments, with Centre-Valve, 4-in. Inlet and Outlet Pipes; only been a few years in use. Also, about 30 ft. of 12-in. Hydraulic Main, in Four Lengths; and a new Iron Elliptical Retort, 7 ft. 6 in. long; all or any part of which may be had a bargain, on application to Mr. SAWYER, Ironmonger, PETERBOROUGH.

WALTER MABON,
ENGINEER.
ARDWICK IRON WORKS, FAIRFIELD STREET,
MANCHESTER,
Manufacturer of

IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

BRYAN DONKIN and CO.'s improved GAS VALVES have been adopted by numerous Gas Companies in England and abroad, and their advantages and great security fully proved. Very large numbers are in use. Prices from 11s. to 14s. per inch diameter.

BRYAN DONKIN and Co.,
Engineers, near Grange-road, BERMONDSEY.

J. CLIFF'S
FIRE-BRICK WHARF,
No. 4, GREAT NORTHERN GOODS' STATION, LONDON.

WORTLEY { FIRE-BRICKS, CLAY RETORTS, LUMPS, AND GUARDS.

A Large and Assorted Stock always kept on hand at the above Wharf.

Orders for London and South of England to be addressed to MARCUS B. NEWTON, Agent for the District, No. 14, South Street, Finsbury Square, LONDON.

(BY HER MAJESTY'S ROYAL LETTERS PATENT.)

SIMONS'S PATENT PERDIFUME,

OR

GAS-SMOKE CONDENSER.

EDWARD SIMONS,
LAMP MAKER TO THE QUEEN,
84, DALE END, BIRMINGHAM.

This invention is submitted to the Public as the perfection of a Gas Shade. It both condenses the smoke and absorbs the noxious vapours arising from the combustion of Gas or other illuminating agents. It thus preserves the colour of the ceiling unimpaired, and maintains the air of the room in a state fit for respiration. In ill-ventilated Rooms it is especially useful, for it withdraws the carbonic acid (produced by combustion) from the air, and prevents the headache and depression which so commonly arise from an accumulation of noxious vapour in small rooms lighted by Gas.

In Rooms sufficiently ventilated, this invention arrests the imperfectly consumed carbon, which, escaping from the flame, deposits itself on all the most delicate articles in the room, tarnishing and discolouring them.

It is hence an ever corrective of imperfect combustion or defective ventilation, immediately coming into operation when either of these evils occur; it is simple in construction, and the first cost is small. It is free from all complication, and may be safely left to the care of Servants; its current cost of working is very trifling, there being nothing more required to be used in the Condenser than a small quantity of SODA, LIME, or POTASH.

SOLE WHOLESALE MANUFACTURERS.
Messrs. BACCHUS and SONS, Glass Works, Birmingham.
Messrs. LLOYD and SUMMERFIELD, Glass Works, Birmingham.
Messrs. WINFIELD and SON, Cambridge Street Works, Birmingham.
Messrs. PALMER and Co., Sutton Street, Clerkenwell, London.

Can also be bought, Wholesale and Retail, at the Patentee's, DALE END, BIRMINGHAM, where the Condensers are constantly in use.

Price—in Glass, 2s. 6d. to 5s. each; Metal, 5s. each.

JOHN DOULTON, BROTHERS, AND CO.,
LIVERPOOL POTTERY, ST. HELEN'S.
STORES—70, SOHO STREET, LIVERPOOL.

MANUFACTURERS OF

Doulton's Stoneware Pipes. | **Doulton's Invert Blocks, for Sewer Bottoms.**
Doulton's Half-Socket Pipes. | **Doulton's Patent Junction Blocks.**

TERRA-COTTA CHIMNEY-TOPS, FIRE-CLAY FLUE-PIPES, RIDGE AND PAVING TILES, &c.

REDUCTION IN THE PRICE OF CLOSET PANS.

DOULTON AND WATTS,
LAMBETH POTTERY, HIGH STREET,
LAMBETH,
Have reduced the Price of their
PATENT ENAMELLED CLOSET PANS,
WITH TRAPS, to
5s. 6d.

These Pans, therefore, which have a strong Vitrified Body as well as a White Interior Glaze, may now be obtained at the price of the commonest description of Closet Pans.

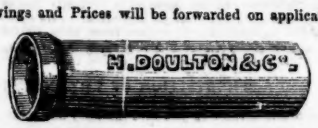
GREAT REDUCTION IN PRICE OF DOULTON'S DRAIN-PIPES.

HENRY DOULTON AND CO.

Beg to inform Builders, Contractors, and others, that they have made a considerable REDUCTION in the PRICES of their

GLAZED STONEWARE DRAIN-PIPES.

Drawings and Prices will be forwarded on application.



MANUFACTORIES: HIGH STREET, LAMBETH, LONDON; ROWLEY REGIS, STAFFORDSHIRE; and SMETHWICK, near BIRMINGHAM.
OFFICES: HIGH STREET, LAMBETH, LONDON.

CONTENTS.

	PAGE
Leading Articles:—	
Notes on Passing Events	147
The Threatened Trade Inquisition	149
The Surrey Gas Consumers' Company	150
Visits to the London Water-Works	150
A Royal Visit to a Gas-works	152
Lord J. Russell's Resolutions upon the Subject of Education	152
Circular to Gas Companies	154
Communicated Articles:—	
Examination of the Process of Making Gas from Coal and from Water	155
Correspondence:—	
The Chairman of the Metropolitan Board of Works	158
On the Fertilising Power of Boghead Charcoal, and the Refuse of Gas-works	158
Sewage Manure	159
Register of New Patents:—	
Holmes' Improvements in the Manufacture of Gas	159
Gilbee's Improvements in the Production of Carburetted Hydrogen Gas	159
De La Rue's Improvements in Treating Burmese Naphtha	159
Dodds' Improvements in Apparatus for Heating Furnaces	160
Newton's Improvements in the Manufacture of Gas	160
Bouchard's Improvements in Producing Gas	160
Longbottom's Improvements in the Manufacture of Gas	160
Provisional Protections	160
Notices of Intention to Proceed	160
Legal Intelligence:—	
Supreme Judicial Court of Massachusets.—John B. Holly, &c., *v.* the Boston Gaslight Company	161
Miscellaneous News:—	
The Metropolitan Board of Works	162
South Metropolitan Gas Consumers' Mutual Protection Association	168
Piggott's Telescopic Gasholder	169
The Water-level of Gas-meters	169
Crystal Palace District Gas Company	170
The Coal Trade of the North	171
Share List	172
Price Current	174

TO CORRESPONDENTS.

Viator.—*The departure of Mr. Croll for Paris,* en route *for Constantinople, was extensively advertised in all the London daily papers about three weeks since; and it is no secret that his journey was in connection with some combination for the introduction of gas into that capital. Hence the spiteful attack of a publication, of which Mr. Croll is asserted to be the proprietor, upon a rival project brought out under the auspices of the founders of the Oriental Gas Company.*

NOTICES.

The next number will be published on Tuesday, April 1, and the subsequent numbers on each successive alternate Tuesday, till our project of weekly publication is carried into effect.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 3, Parliament Street, Westminster; and orders for Advertisements to Mr. W. B. King, the Publisher, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT

TUESDAY, MARCH 18, 1856.

NOTES ON PASSING EVENTS.

THE Metropolitan Board of Works appears at last to have entered upon the practical phase of its existence, and, we fear, to begin also to appreciate some of the difficulties of the position it is placed in by the very unsatisfactory nature of the act of Parliament under which it is constituted. The Bill for the Explanation and Amendment of the Act for the better Local Management of the Metropolis, and the species of conflict which has arisen with respect to the new sewer in process of construction in Fetter Lane, show at least that the relative powers of the General Board, and of the minor local authorities, are very far from being either satisfactory or easily understood. On the other hand, the numerous schemes for parks, new streets, and communications, and the inevitable squabbles about the sizes and dimensions of sewers, which have already "cast their shadows before," must inspire anxiety in the minds of those who are interested in the result of the great experiment now being worked out.

With respect to the bill to alter and amend the act 18 and 19 Vict., c. 120, we would observe, that its tendency is decidedly to make the measure, to which it simply appears to be a "rider," a substantive act for the creation of a municipal council for the whole metropolis. It may fairly be questioned whether or not such a measure ought originally to have been proposed; and, for our own parts, we can see little reason why the suburban parishes should have been excluded from the full and entire management of their own affairs, any more than why the City should so have been privileged. A corporation for London was, in fact, we believe, wanted; instead of a corporation for the City of London, and a series of powerless, isolated parishes, exposed to the fantastic tricks of Sewers Commissions and Home Secretaries; but we protest, in the name of public morality, against the underhand manner in which this desirable object is sought to be effected. The 18th and 19th Vict., c. 120 was avowedly designed for the purpose of "making provision for the better local management of the metropolis, in respect of the sewerage and drainage, and the paving, cleansing, lighting, and improving thereof." There were express stipulations made in the act that the regulation of matters connected with the church, the relief of the poor, and the other ordinary duties of parochial vestries, should not be included in the powers of the new boards to be created under its provisions. Perhaps it was absurd to suppose that two vestries could exist in the same district; and it cannot have escaped the notice of the adroit parliamentary tacticians who have taken our metropolitan interests under their protection, that, sooner or later, it would be necessary to merge them into one collective vestry. But we contend that this ought at once to have been declared, or that being now found necessary, effective measures should be taken to ensure the reality of a popular representation in the local vestries, about which so great a parade of liberality is made. The qualification for the vestries, under the 6th clause, 18 and 19 Vict., c. 120, is an assessed rental of £40 per annum; and it is necessary to occupy a house assessed to the poor-rates at £25 per annum, even to vote at the elections. In several of the poorer parishes, this will disfranchise nearly all the present electors; and the petition lately presented to Parliament by the inhabitants of St. Nicholas, Deptford, may be cited as a proof of the hardship and the wrong which may be inflicted by the careless legislation now in fashion. This petition is drawn up with great skill, we would observe; and it points out the fact that, if the bill to amend the act of last year should pass in its present form, so strange a state of confusion in the rating powers of the old and the new parochial authorities will be created, that it will inevitably be necessary at some future period to introduce an additional "bill to amend the bill to amend the act." Yet men who commit blunders, and resort to tricks of this description, are called statesmen!

We are equally convinced that the framers of the act must have forseen—or at least they ought to have done so—that a conflict would at some period arise between the Commissioners of Sewers of the City of London and the Metropolitan Board of Works. It is fortunate, perhaps, that the question has been raised, now that the Government has given notice of a bill to regulate the Corporation of the City of London; and we hope that the authorities connected with the latter will act with more vigour in defence of their rights than they hitherto have done. There are, no doubt, evils in conflicting jurisdictions upon the same subject matter; but we might learn by what has already taken place here, and in other countries, that there is nearly as much danger in throwing uncontrolled power into the hands of one central representative municipal body, as there is in throwing it into the hands of the central government. By the exercise of good feeling and consideration on the parts of such independent local authorities as the corporation and the vestries on the one hand, and of the Metropolitan Board of Works on the other, the ultimate interests of the ratepayers are more likely to be advanced than by an undue development of the power of either of those bodies. We all require and gain by the existence of a real sense of responsibility, and by the knowledge that, if we do not act correctly, others are at liberty to oppose and set us right. For the sake, then, of the well working of the Metropolis Management Act, we desire still to see the City retain its partial independence; but we hope, also, that the corporation authorities will bear in mind, that if they possess the right to act according to their own discretion in some things, it is before all, and beyond all, their duty to co-operate with the measures for the general good, and to waive all unnecessary assertion of the mere letter of their privileges, in order to carry out their spirit.

Mr. Burslem appears to have looked at the question of the purchase of Hampstead Heath in the most sensible and business-like manner of any members of the board. As he said very truly, "Where are the funds for operations of this kind to come from?" No doubt it is not only desirable, but we believe even essential, for the health of our overgrown and densely-peopled metropolis, that large open spaces should be preserved around it, where the air necessary for our consumption might renew itself, and where Londoners should be able to see some forms of Nature face to face; but we equally hold that the expense of providing these places of recreation ought to be borne by those who profit by them. The north-west of London is already highly favoured in this respect; and, when it is borne in mind that both Hyde Park and the Regent's Park have been devoted to the use of those districts, we think that the other portions of the metropolis are entitled to be considered before the parishes of Marylebone, St. Pancras, and Hampstead. More immediate good would, we believe, be effected by the completion of the Victoria Park—which happens, unfortunately, not to be within the borough of a Minister of the Crown—by the creation of a park near Highbury, or by the creation of one between Camberwell and Peckham, than by the purchase and enclosure of Hampstead Heath. But even these operations ought to be paid for by the localities directly interested. At any rate, until the Metropolitan Board of Works shall have seriously undertaken the great duty of improving the sewerage and drainage, for which it was especially created, it appears at least premature to force upon it the consideration of a class of improvements of a more secondary character. We would add, that it strikes us as being advisable that all projects for the formation of new parks, streets, and roads, should be referred to some committee of the board, instead of being thrust forward at the expense of its more serious business. A great deal of valuable time has recently been lost in this manner.

It is to be regretted that so valuable a member of the board as Mr. Hunt should have been compelled to resign his seat; and we fear from the short speech made by his successor, Mr. Leslie, that the latter gentleman has not profited by the lesson he ought to have derived from the ignominious dismissal of the Commission of Sewers, of which he was formerly a member. The tenour of his observations induces us to believe that he will again thrust his crotchets on pipe-sewers before the public; and we therefore urge him, and all who ever thought with him, to inquire into the real state of the pipe-sewers in Bermondsey, and in the other parts of the metropolis, where slight inclinations only are attainable. The local surveyors have lately been obliged, in some of those districts, to apply to the water-works' companies for water to flush these much-vaunted self-cleansing sewers, which are becoming even more rapidly choked up than the old sewers of deposit. At Croydon, as we had once before occasion to observe, it has been found necessary to flush the "self-cleansing" pipes once a week; it is now proposed to flush those of Bermondsey, we are informed, once a fortnight, by means of a stream delivered from a 3-inch pipe. This is becoming a very serious question, both with regard to the parishes and to the water companies, who are exposed to obloquy if they will not consent to a sacrifice in order to obviate the blunders of a few men, who, on their own parts, will not recollect that there is no royal road to science.

Fortunately for the inhabitants of London, the "snobs" have been defeated in their attempt to spoil St. James's Park; and a very common-sense decision, entailing, unfortunately, some expense, has been arrived at on this subject. The merit of securing this result is mainly to be attributed to the decided opposition with which Sir B. Hall's plan was treated by the press, especially by the *Times*. Of course, when the opposition assumed a serious character, the plan was withdrawn, and "dear Shelley's" letters secured a disavowal of any foregone conclusion; but we have been informed, from good authority, that the contract for the proposed road and bridge across the garden had actually been signed; so that we recommend our brethren of the press, and the metropolitan public, still to watch vigilantly the proceedings of those in charge of the parks. Talk about Queen's parks and people's parks, indeed! We had thought the days when such distinctions were admitted, had passed away with select vestries.

Another of Mr. Lowe's bills for disturbing the commercial relations of our country has been withdrawn, and the Law of Partnership Amendment Bill has gone to the limbo of abortive Whig legislation. Mr. Lowe bids fair to attain a certain amount of distinction by his failures, and to secure a mess greater even than Benjamin's. The Joint-Stock Companies Bill, however, is still being urged forward; and no serious attempt has been made to guard against the recurrence of such fearful frauds as have lately been effected by a man who was even once a Lord of the Treasury. Emphatically do we warn the public that there must shortly arise a season of ruin and misery, such as we have never heard or seen, if the wild spirit of speculation, which must be developed by the facilities proposed to be granted to joint-stock companies, with limited liability, but without any check or control upon the originators or managers, be let loose upon us. As we before said, we believe that an adaptation of the French law of partnership *en commandite* would be desirable; but Mr. Lowe's bill, now before the House, is nothing but a parody on the French law of partnership *en société anonyme*, which all French economists consider to have been fraught with evil. No arguments have been brought forward in favour of the Joint-Stock Companies Bill; no attempt has been made to remove the objections to the utter absence of guarantee from the malversations of the directors of such companies; but a plentiful abuse of the monopolists who oppose the measure has been indulged in, and the stale trick of calling names, when no arguments could be found, has been resorted to. In the meantime, it appears that the French Government, alarmed at the rage for joint-stock companies, has issued a notice that no new ones will be authorised. This is both a contrast to the proceedings of our Government, which seems to be anxious to foster the spirit their model seems to be anxious to repress; and a hint that, after all, the formation of joint-stock companies will, in all probability, sooner or later be made to depend upon the good-will or the discretion of the Central Government. A correspondent objects to the tone of our remarks upon Mr. Lowe's bills and parliamentary conduct; but really they appear to us to be fraught with so much mischief to society in general, that we have felt it our duty to protest against them in every possible manner. Our remarks upon Liberals in power were not intended by any means as a reflection upon a political party of any colour, but rather as a protest against the manner in which the principles, previously enunciated, are cast to the winds when office has spread its temptations before the men who presented themselves as the advocates of the public interest. We firmly believe that the Socialist doctrines of the present Ministry will eventually be a source of incalculable mischief to the country, and therefore it is that we object to them. Our correspondent seems to think that we are stepping out of our way in noticing these matters; but we would remind him that the objects of our JOURNAL are, after all, more closely connected with political economy than with abstract science.

The "Bill for the further Amendment of the Laws relating to Labour in Factories," is another advance in the course of centralization into which we seem to have entered full sail. The interpretation of the clauses 21 and 43 is withdrawn from the umpires to be named under their provisions, and the inspectors and sub-inspectors are to be entitled to decide, without appeal, what portions of machinery in a factory are to be covered or fenced. After the strange freaks of Mr. L. Horner, it does appear to us inexplicable that manufacturers should consent to place themselves unreservedly at the mercy of a body of men so little able to form an opinion as to what portions of mill-gearing are likely to cause bodily injury to any person employed in a factory. But, as there have been numerous petitions in favour of the measure, it is to be supposed that, like the wife in Molière's play, the manufacturers "like to be beaten."

Evidently the General Board of Health is, to use a vulgar phrase, "hard up for work," since it kindly undertakes to see that all the children to be born after January 1, 1857, shall be vaccinated. Some day or other we suppose that a law will be passed that everybody shall wear flannel waistcoats, in order to diminish the number of catarrhal affections, or that every child shall be confirmed—an operation supposed by the caricaturist to have some connection with vaccination. There is some change coming over the spirit of our dream; for, in other times, the English people were rather disposed "not to do good when the devil bade them;" but now we appear to allow any Mrs. Malaprops to dictate to us how we are to perform our most ordinary domestic duties. Many very able physicians question the efficacy of vaccination, and many also believe that it propagates other forms of disease as dangerous as the one it is proposed to remedy. It must, therefore, be

injudicious to enforce, by penalties, a system which is still of doubtful efficacy; and whether or not the universal success of vaccination be established, it seems to us objectionable that the state should interfere in matters so purely personal and domestic. Where is all this Paul-Pry Samaritanism to stop?

It is understood that the General Board of Health has prepared the draught of a bill for the continuance in office of that most useless and expensive means of State intervention in affairs which would be far better managed without its existence. At present, whilst the nation is suffering under war taxation, it seems strange that no independent member should call the attention of the House to this most expensive and unnecessary body; but it is to be hoped that the debate which must ensue upon the presentation of the threatened bill, will enable some check to be placed on its proceedings; for, in the evenly-balanced state of our political parties, it is not to be supposed that so "snug a job" should be sacrificed. We hope that the gas and water companies will take care to be more efficaciously protected than they hitherto have been, or than they were proposed to be by the bill of the last session; and that they will expose the fearful amount of mischief effected by the absurd doctrines and the injudicious conduct of the General Board of Health.

THE THREATENED TRADE INQUISITION.

Truly we live in times when constituted authorities appear to fancy themselves bound to right the wrongs of everybody, and to surround the exercise of the ordinary avocations of life with so many precautions that it is almost impossible to live. The numerous class of small shopkeepers and tradesmen are now being made to feel the effects of the socialist doctrines they themselves were so anxious to apply to the public companies and the large industrial establishments they fancied to be established at their expense; and the provisions of several acts they assisted in passing are now in course of application to themselves, as though it had been intended to convince them that the infliction of a wrong of any kind invariably recoils on its authors. That most ridiculous and iniquitous measure, the Public Health Act, was obtained mainly by the support of the municipalities, who were set in motion by the desire for cheap water, cheap sewerage, and cheap gas. Under cover of the exitement thus created, a series of enactments were smuggled through the Legislature, the effect of which is simply to place the whole of the trading community, agricultural or municipal, at the mercy of a set of ignorant quacks, called inspectors of the Central or of the Local Boards of Health. Fortunately, these officers have not had discretion equal to their power; and they have played such fantastic tricks, that it is to be hoped the country constituencies will insist upon a proper examination of the Public Health Bill it is proposed shortly to introduce; an examination which we hope will be of a more serious character than that given to the bill smuggled through the House last year by the former very acute President of the Board of Health.

In London, the manufacturers of Lambeth, Southwark, and the Tower Hamlets have, we regret to say, lately stood by calmly and indifferently whilst their colleagues in Finsbury have been exposed to the effects of that other most iniquitous measure, the Smoke Nuisance Abatement Act, which was retained by so contemptible and unworthy a manœuvre on the part of the Government last session. The apathy of the other districts of the metropolis during the destruction of the property of the Belle Isle nuisances, as they are called, is inexplicable; and, indeed, it almost seems to invite the application of a similar system to themselves; and the manufacturers who stood by whilst this injustice was perpetrated may depend upon it that the useless functionaries of the Boards of Health will not allow the precedents they have once established to remain without extension. It appears to be useless to attempt to rouse an efficient opposition to the application of a system which does not immediately injure large bodies of men; but the the whole of the trading portion of the London community will inevitably be made to feel, sooner or later, that when it allows one section to be oppressed by the arbitrary and unreasonable system to which we have alluded, all the others will suffer from the same cause. Again and again have we, in this Journal, contended that the smells given off from any process of trade, even though they may be offensive, are not therefore necessarily noxious: as often have we contended that it is dangerous to allow the decision of civil cases of this nature to be left to the Police Courts; and that eventually all society will suffer from the attempts to obviate evils which are only imaginary, by proceedings in which all ordinary legal guarantees of property are neglected, or studiously set aside. "*Quem Deus vult perdere prius dementat*"—we suppose the manufacturing interests of this great community, which were formerly considered to constitute its strength and support, are to be sacrificed to the whims of a few delicate-nosed, crotchety, sanitarians—men who "die of a rose in aromatic pain;" and so the manufacturers are blinded to the consequences of the attempt to apply to them the maxim, "*Divide et impera.*"

Then, again, a great excitement has been raised by a set of scientific alarmists, whose quarrels amongst themselves do not reflect much credit on their heads or their hearts, about adulteration of food. Certainly adulterations of food are very bad and very reprehensible, but it is sorely to be suspected that the evil so asserted to be produced exists more in the imagination of the old women they (the adulterations) frighten than it does in fact; for it is singular that we Englishmen should retain our privilege of being the longest lived race on the globe, in spite of all the abominations we are said to send down our throats. But the absurdity of all this pother is to be found in the fact that the law, as it now stands, is quite sufficient to deal with any real evil of this description which may be proved to exist; and that, therefore, to pass new laws on the subject is only to increase the already monstrous number of dormant or useless statutes. The 64th clause of the Public Health Act, and the 26th clause of the Nuisances Removal Act, arm local authorities with powers to act in cases of adulteration of food, or the exposure of meat, fish, vegetables, &c., which, properly exercised, would render totally unnecessary the appointment of any central board of chemical examiners; and which, in fact, are principally objectionable on account of the summary, arbitrary, and irresponsible powers they confer on a class of officers too often of an ignorant and prejudiced character. The recent proceedings at Wakefield, in the cases of asserted adulteration of flour, show not only to what an extent this petty tyranny may be carried, but also the very unsatisfactory nature of the tribunals to which cases of this kind are referred, and the utter impossibility in which the injured party is placed of obtaining redress. By the way, we would say here, that any one who is desirous of studying the existing state of the common or the statute law of England upon the adulterations of food, should consult Mr. Toulmin Smith's admirable work, "Practical Proceedings for the Removal of Nuisances." Our law-mongers would also do well to study in this book the noble system of legislation they have lately been tampering with and defacing; the book itself is worthy of the cause it was avowedly written to advocate.

The last Wakefield case is, however, nearly as follows:—The inspecter of nuisances of the Local Board of Health seized, in a shop belonging to a Mr. John Jackson, a quantity of flour, which he declared to be unfit for human food, upon the strength of some analysis made by Messrs. Bowditch and Statter; the former a clergyman, somewhat known to persons connected with gas purifying, and the latter a medical man resident in the town. The summonses were issued to try the case before the magistrates in petty sessions; and, as the quantity seized was considerable, the penalty heavy, and the costs of proceeding expensive, the result was a matter of more than usual importance to the accused; whilst the recent occurrence of similar proceedings had so roused popular prejudice, that it appears to have been admitted on all sides that "a strong animus was displayed on the part of the prosecution, with, apparently, a determination to get a conviction at all hazards;" as must always be the case when popular authorities pander to a popular cry.

Mr. Bowditch, in his evidence in chief, said that he examined the samples of flour sent to him, and found them to contain sulphuric acid, lime, and also magnesia; but, although he admitted that all these ingredients were to be found in pure flour, he also admitted that he had not ascertained in what proportions they existed in the samples he had analysed, but had contented himself with the bold assertion that they were present in abnormal quantities, such as to render the flour unfit for human food. The only other scientific evidence (we beg pardon for the use of a cant phrase of the day) was that of Mr. Statter, who assisted in making the analysis, but was as ignorant of the real results; and that of a medical practitioner, who of course could declare that flour containing the above-named substances in excess was unwholesome. To rebut such trumpery evidence, it was, however, necessary for

Mr. Jackson to engage the services of Professor Way and Dr. Normandy; and from their evidence it not only appeared that the flour in question was pure flour, but also that the very methods of analysis, which Mr. Bowditch said that he had employed, were themselves likely to have introduced the injurious ingredients of which he complained.

Really, it is monstrous that the reputation and the fortune of fair, honest tradesmen should be exposed thus to be endangered by the presumptious ignorance—or perhaps the malignity—of dabblers in chemistry, who are so likely to create the evils of which they complain. The inspector, no doubt, may have acted to the best of his ability in this matter; but, as that officer is protected from the consequences of any act he may perform in the execution of his duty, by the 140th clause of the Public Health Act, 1848, and by clause 42 of the Nuisances Removal Act of last year—and the local board of health is eqaully irresponsible—it follows that, practically, there is no remedy for a state of things which may entail the utter ruin of large classes of society. Undoubtedly it is well that public authorities should possess powers which should enable them energetically to check the frauds of dishonest tradesmen; but it is equally essential to the well-being of society in general that it should be rendered difficult, if not impossible, for such authorities to inflict grievous private injustice, or to cause serious private loss, unnecessarily, under the pretext of public good. As we have said elsewhere, in this number of our JOURNAL, the exercise of a right ought to imply the fulfilment of a duty; and if an inspector of nuisances have the right to seize summarily food he may consider unwholesome, it is his duty to ascertain that it really is so before he exposes the tradesman against whom he proceeds to loss and obloquy: and, as the law has imposed penalties upon the tradesman who really does expose for sale food unfitted for human consumption, so, we contend, the public authorities ought equally to be punished if they carelessly or wrongfully accuse an innocent person. Unfortunately, the whole tendency of our recent legislation has been to establish the principle that society in general can do no wrong; whilst it is assumed that individuals are always arrayed in hostility to the public interest. Until correcter opinions prevail upon the morals of public life, we fear that it is in vain to expect that the gigantic system of frauds we all complain of in private can be efficaciously attacked.

THE SURREY CONSUMERS' GAS COMPANY.

ASSOCIATIONS of gas consumers are, to gas consumers' companies who have no further need of their services, what Frankenstein's monster was to its author; the creature could no more comprehend that vitality had been given to it merely to hew wood and carry water, than associations of gas consumers can believe that their only mission has been to call into existence new companies more exacting and overbearing than those they were intended to hold in check.

The report, which will be found in another column, of a meeting of the "South London Gas Consumers' Mutual Protection Association," is an example of the truthfulness of the parallel we have drawn, and of the retributive justice which awaits all who condescend to gain their ends by unprincipled means. The Surrey Gas Consumers' Company was established by the agency of the body of which it would now fain ignore the existence; and though we can have no sympathy with either party, we cannot forbear to characterise, in the terms it merits, the uncourteous and disgraceful refusal of the Surrey Company to receive a deputation from the Consumers' Association. Such a course is all the more impolitic, as it is notorious that this company is committing a fraud upon the Legislature and the public in leasing its works to a contractor, in defiance of its obligations under the Gas-Works' Clauses Act, 1847, by which the price of gas ought to be reduced whenever the profits of the undertaking exceed 10 per cent. upon the capital invested. This company has for some time past paid a dividend of 8 per cent., and if the, doubtless exaggerated, statements of the contractor's friends are only partially true, his profits considerably exceed the 2 per cent. remaining to complete the maximum profit of 10 per cent. The leasing of a gas-work by a company acting under the Gas-Work Clauses Act, 1847, is clearly a violation of its obligations; and the intention of the Legislature in this respect has been recently evinced by the striking out of the leasing powers sought to be introduced in several gas bills now before Parliament. The maximum profit-clause would otherwise afford no protection to the public; for, if the leasing of works were authorised, there would be no limitation of the profits of the undertaking, and the maximum price of gas might be charged in perpetuity.

If, therefore, the Consumers' Association, instead of sending deputations to such a body, and being unceremoniously refueds an audience, will take measures to compel the company to produce a true account of the receipts of the undertaking, and the expenses of carrying it on; and it shall appear therefrom that the profits exceed 10 per cent. upon the capital, they will be entitled by law to an immediate reduction in the future price of gas, and to a return of the excess they may have unduly been called upon to pay while this state of things has been in operation.

VISITS TO THE LONDON WATER-WORKS.

IT must not be supposed that the operations of the three companies whose establishments at Hampton we described in our last number, have been confined to the execution of the remarkable works at that spot. These were, indeed, but the smallest portion of the charges imposed upon the various companies by the acts of 1852; and we are convinced that, if the public would take the trouble to ascertain for itself the real extent of the sacrifices they have made to secure a purer supply of water, a great deal of the prejudice existing against the metropolitan water companies would at once be dissipated. Equally are we convinced that any such impartial investigation would prove to reasonable men, of whatsoever shade of politics, that the action of private enterprise is, in such matters, preferable, because more efficacious, to that of municipal bodies, or of the central government itself; and it is with strong feelings of national pride that we invite a comparison between the water supplies of London and of Paris: between this detail of our much-abused municipal organisation and that of our neighbours, whom we are now recommended to imitate.

To resume our account of the existing state of the establishments for the distribution of water:—We visited the filtering and pumping establishment of the Southwark and Vauxhall Company, in Battersea Fields. It consists of two large settling reservoirs, of the respective areas of 84,000 and 144,000 superficial feet, and so disposed that the water is obliged to traverse the whole length of the two reservoirs before it is admitted to the filter-beds. The three filters present a surface of filtering medium of the respective dimensions of 35,000, 86,000, and 76,000 feet superficial; and, as the quantity of water they are required to purify is calculated to be 10,000,000 gallons per 24 hours, it follows that the duty these beds will be required to perform will not exceed 51 gallons per foot superficial. The filtering medium consists of sand and gravel of various degrees of fineness, and is of an average thickness of 5 feet, working under a head of 2 feet when in their ordinary condition. The depth of water in the reservoirs varies between 13 and 16 feet.

From the filter-tunnels, the water, most perfectly cleared from mechanical impurities, passes to the pumping-wells, and is raised by means of a series of engines of a collective force equal to 540 (nominal) horses' power. These engines are, 1, a double-acting fly-wheel engine, by Bolton and Watts, with 42-inch cylinder, 6 feet 6 inch stroke, making from 16 to 18 strokes per minute, and setting in motion a double-action pump, with four valves of 1 foot 4 inches in diameter, and 4 feet 4 inches stroke. No. 2 is a beam Cornish engine of 64 inches diameter, and 10 feet stroke, working from 9 to 12 strokes per minute, when under normal conditions, and having a 32-inch pole with a 10-feet stroke. No. 3 is also a beam Cornish engine, with a 64-inch cylinder, and 11 feet 6 inch stroke, and a 33-inch pole, with 10-feet stroke, working at the same speed as No. 2. No. 4 is a direct-acting Cornish engine, with a 70-inch cylinder, and 10-feet stroke—pole $33\frac{1}{8}$ inches diameter, and 10-feet stroke, also making from 9 to 12 strokes per minute. The steam for all these engines is obtained from 11 boilers, under which Welch coal is burnt; for, after trying all manner of smoke consumers, Mr. Quick has been convinced that smokeless coal and careful stoking are the only infallible means of avoiding what the euphuists of the Home-Office call "dense volumes of opaque smoke."

These engines, at present, pump the water over the large stand-pipes which form such conspicuous objects in the somewhat uninteresting landscape of Battersea Fields. The larger of these pipes is 4 feet 6 inches in diameter at the bottom, diminishing to 4 feet at the top, with two descending legs of 24 inches diameter each; the smaller one has one 2 feet 6 inches

diameter, and one 1 foot 3 inches in diameter rising leg. and one 2 feet 6 inches descending leg. In both, the height of communication of the descending legs with the upper cisterns is placed at about 155 feet above Trinity Datum; but, from the fact that the reservoir rises considerably above the point of junction, the water is, under certain conditions, raised to a total height of 186 feet above Trinity Datum, or about 190 feet above the level of the water in the pumping-well. The Southwark Company have not yet erected any covered reservoirs, because they keep up the supply in their mains entirely by the action of their engines, some of which are working day and night. About 14 acres of land have, however, been purchased at Peckham, near Nunhead Hill, upon a slope, such as eventually to admit of the formation of two reservoirs respectively at 150 and 250 feet above datum. In the present state of the supply of this district, Mr. Quick considers that it is more economical to keep the engines thus constantly at work, than to sink the large sums of money necessary for the construction of the reservoirs the district would require. The total duty, that is to say, the actual weight of water lifted by the various engines of the Southwark Company, is equal to 80 million pounds per hundredweight of coal.

It appears that by the time all the works undertaken by this company for the improvement of its supply shall have been completed, its total outlay will not fall short of £200,000. The quantity of water now supplied per house, on the aggregate, is said to be 190 gallons. Oddly enough, the old women of Bermondsey, whose interests Mr. Chadwick so chivalrously defended, complained that "they cannot make so good a cup of tea as they used to do." Perhaps they regret the absence of the organic matter which tended to soften the water taken from Battersea reach, and really had less dread of the "chimeras dire" in the latter than their self-entitled friends choose to assert that they felt.

Before describing the distributing establishment of the West Middlesex Water-Works, we would beg to correct two errors into which we fell in our account of the supply works of this company. These were, first, that we stated the engines were, like those of the Southwark and Grand Junction Companies, of 60-inch diameter cylinders, and 42-inch poles, whereas they are 64-inch diameter cylinders, and 45-inch poles; and, second, we also stated that the main of the West Middlesex Company was a 33-inch main, whereas it is 36 inches in diameter, and the 33-inch main from Hampton was laid down for the purposes of the Grand Junction Company.

The main from Hampton, which supplies the works of the West Middlesex Company, is conveyed to the filtering establishment at Barnes. There are at this spot formed two large subsiding reservoirs, of not less than 16 acres total area, which might well have induced the directors of this company to consider the formation of any preliminary reservoirs at Hampton of doubtful necessity. Those at Barnes are so formed that the water must traverse a very considerable length before it reaches the filter-beds, over which it is conducted very gently. The filter-beds, three in number, have a total area of 4 acres; the filtering medium being 4 ft. 6 in. thick, working under a head of 4 ft. 6 in., and passing on the average, when in their usual working order, about 4 gallons per foot superficial per hour. From the beds the water passes into a covered well in immediate connection with the tunnel communicating between the establishment at Barnes and the pumping-engines at Hammersmith; the tunnel is, in fact, a cast-iron pipe laid under the bed of the river by means of coffer-dams.

The engine power at Hammersmith consists of four engines, with a total nominal power of 595 horses. The three oldest are modified Bolton and Watts' engines; the newest and most powerful being a beam Cornish engine of 250-horses' power; the former working with 28 lbs. steam, the latter with 35 lbs. steam. In his boiler furnaces, Mr. Hack has adopted a system of hollow cast-iron bars, communicating with a split bridge, and admitting a quantity of air to the back of the grate, regulated at will by dampers. By this modification, he is able to burn small coal, or screenings, without exposing himself to the annoyance of the modern spies; but, after all, it appears that the great secret of the prevention of smoke—the *consumption* being impossible—consists in careful stoking and sufficient surface of grate. If these essentials be attended to, there will be no necessity for resorting to the numerous patent inventions for accomplishing an object in opposition to the laws of Nature.

From Hammersmith the water is pumped through the distributing mains, from which it is drawn directly, during the daytime, to a covered reservoir, situated at Little Barrow Hill, near St. John's Wood, at a height of 177 feet 6 inches (measured to the top water-line) above Trinity Datum. The mode of covering this reservoir is very elegant and effective, besides being remarkably economical. It consists of a series of hollow brick arches, 6 inches deep at the crown, with the haunches filled in with concrete—forming the channels for carrying off the rain-water; the arches spring from cast-iron skewbacks, tied together by iron rods in such a manner that the thrust of the arches is counteracted, and it is possible to withdraw any intermediate bay without affecting the stability of the rest of the structure. These cast-iron skewbacks rest upon transverse systems of arches, springing from brick piers of ordinary materials; and the dimensions from centre to centre-lines of these bays are respectively 20 feet 11½ inches and 21 feet 6 inches: the total capacity of the reservoir being equal to 22,000 tons of water, with a depth of 20 feet. By the side of this reservoir a 25 horse-power double-acting pumping-engine, with crank and fly-wheel, has been erected, for the purpose of raising the water to 125 feet additional height. Mr. Hack informed us that the cost of the very efficient reservoir we have attempted to describe was not much more than £4716, which would make it appear that the cost per square did not much exceed £6; and although that price did not include the paving of the reservoir, or the foundations of the piers situated in the level portions, it must nevertheless be considered to be very low, as well as to reflect great credit on Mr. Hack's engineering talent.

The West Middlesex Company have also purchased a plot of land near Kiderpore Hall, Kilburn, for the purpose of forming eventually an aditional reservoir, at 287 feet above Trinity Datum. The outlay they have lately undertaken is estimated to be about £170,000; the average quantity of water they supply per house is not less than 208 gallons per diem.

The Grand Junction Water-Works' Company have formed their filtering establishment at Kew, close to their old pumping-station. There are two settling reservoirs, one of 90,000, and the other of 180,000 superficial feet, and three filter-beds, of 80,000 feet superficial each, of the same construction, and working under the same head of water as those previously described at Battersea. The engine power even now existing at these works is equal to about 820 nominal horse power; and it is proposed still further to increase it to the extent of 170-horse power additional. There are two Bolton and Watts' engines—single-acting beam-engines—with 60-inch cylinders and 7-feet stroke, making from 12 to 13 strokes per minute, with pumps 24 inches diameter and 7-feet stroke, which it is proposed to alter to 32-inch diameter pumps, in order to force the water to a new reservoir about to be formed at Camden Hill, at a level of 156 feet above Trinity Datum, and of a proposed capacity of 6,000,000 gallons. There are also a Maudsley's pumping-engine—with a 60-inch cylinder and 6 feet 6 inch stroke, working a 24-inch pole, with a 6 feet 6 inch stroke—and a large Cornish beam-engine, with a 90-inch cylinder, and 11 feet 6 inch stroke, working a 33-inch pole, about to be altered to 38 inches, of 11 feet 6 inch strock. The proposed additional engine, of 170-horse power, is to be a direct-acting Cornish engine, with a 70-inch cylinder, a 28-inch pole, and a 10-feet stroke.

In addition to the colossal works thus described, and the supply establishment at Hampton, the Grand Junction Company have commenced the construction of an engine-house at Camden Hill, to receive three engines similar to the one last mentioned, for the purpose of forcing water to a second resorvoir, for which they have purchased 33 acres of land at Shoot-up Hill, at a height of 276 feet above Trinity Datum. There are at Kew already 7 boilers, but it is intended to increase this number to 12; and the foundations for the house intended to receive the new boilers have actually been commenced. At present, the water supplied in the district of this company passes over the large stand-pipe at Kew, and the engines are worked day and night. The stand-pipe itself is about 215 feet above Trinity Datum, of 4 feet 6 inches diameter at bottom, reduced to 3 feet 6 inches at top, and with 4 descending legs of 15 inches diameter each. It is calculated that the Grand Junction Company supply about 250 gallons per dwelling-house on the average of their district; but that, if no deduction be made for street-watering or large consumers, the average per house would amount to the enormous quantity of 345 gallons. It would form the

subject of an inquiry of some interest, to endeavour to ascertain the causes of the marked differences in the consumption of water in the various metropolitan districts. We may add, that the total amount of outlay incurred by the Grand Junction Company since 1852, cannot be estimated at less than £200,000: a fact we commend to the especial consideration of the tenants of the Paddington estate. Those gentlemen forget, that not only is the consumption of water in their district greater per house than that of any other portion of the metropolis, but also that the conditions under which the water is to be delivered are such as to entail upon the company great additional expense in their supply.

Mr. Quick, the engineer for the Grand Junction and the Southwark Works, mentioned to us a fact of some practical interest. It was, that during a heavy gale of wind from the N.E., accompanied by much hail and sleet, which occurred during the frost of last year (the winter of '54 and '55), three of the upper pipes of the north-east descending leg of the stand-pipe, and one of each of the other exposed legs, were split to such an extent as to render it necessary to replace them. Writers upon physics consider hail to be accompanied by a disturbance of the conditions of electricity in the atmosphere: and it therefore becomes an interesting question, whether or not the vibrations produced in the molecules of the cast iron by the change of electrical condition, superinduced by the hail, caused the fissure of these pipes. We have, ourselves, known large iron castings appear to be perfectly sound for several days, but to crack suddenly upon the occurrence of a thunder-storm. Perhaps the accident at Kew may induce some one to investigate this subject more satisfactorily than it has hitherto been, for the universal application of cast iron renders it necessary to ascertain the precise nature of the cause likely to affect its safety.

A ROYAL VISIT TO A GAS-WORK.

At a time when the most incompetent executive of modern times is striving to extend its ill-used power by jobbing away commissions at the cost of our industrial interests, it is no small gratification to find the highest authority in the realm doing homage to that indomitable spirit of commercial enterprise and skill which has marked us out as the world's manufacturers. Such is, nevertheless, the contrast now frequently exhibited to our eyes; and, whilst a singularly corrupt Legisture is obviously intent upon crushing the industrial avocations of the people beneath the exotic heel of centralisation, the Majesty of England may be seen graciously intermingling with the toil-worn sons of labour, and in person acquiring a practical knowledge of those very operations and processes which constitute the basis of our national wealth and greatness. These processes, Ministers tell us, require to be carefully watched by well-paid sanitary officers, for the purpose of limiting their pestilential action. These processes, says royalty, are the vitality of my people; and I laugh to scorn equally the cowardice of ignorant prejudice and the baser motives of cunning selfishness. "I should like to see those other three retorts drawn," was the undaunted exclamation of Britain's hope—an exclamation fit to be recorded in letters of gold upon the portal of the manufactory in which they were uttered. But we are anticipating our story.

Not many weeks ago, a letter was received in the evening by the officers of a certain gas-work, which letter informed them that next day the sanitary Socrates of the district would favour them with his company for the purpose of determining whether, in addition to coal gas, they did or did not also manufacture cholera, typhus, and all the other "ills that flesh is heir to." Next day, true to his appointment, Socrates came, and, "Fee, fah, fum! he smelt the smell of a working man;" then evaporated in considerable trepidation to write a report, the value of which cannot be expressed in figures, and will probably, therefore, never be known. By a strange coincidence as to time and circumstance, a letter was received on Monday evening, March 10, announcing to the authorities of the Chartered Gas Company, that on the following day his Royal Highness the Prince of Wales would visit the West minster station of the company, and inspect the process of manufacturing gas. Next day came, and with it, sure enough, a goodly and distinguished group of visitors, including his Royal Highness the Prince of Wales, the Prince Alfred, Colonel Phipps, and Mr. Gibbs, the accomplished tutor to the princes. They were duly received by the governor (Benjamin Hawes, Esq.), the deputy-governor, a majority of the directors, the secretary (Mr. Burls), and the consulting-engineer of the company (George Lowe, Esq.); whilst to the superintendent of the station (F. J. Evans, Esq.) was confided the important task of conducting the distinguished party over the works, and explaining the various operations of the manufacture of gas. Suffice it to say, that everything was seen, inquired into, and comprehended by the royal strangers—the retorts, condensers, and purifiers were all shown in full action; a small experimental apparatus, in which the process of making gas was exhibited on a minute scale, elicited much admiration; and the comparative values of the cannel and common gases made at these works were seized upon with an intelligence and avidity that seemed almost to imply a previous acquaintance with the details of photometry. The distinguished party remained more than an hour and a half, and quitted the works evidently much gratified with their visit; the proof of which has since assumed a tangible form in the shape of a very flattering letter of thanks to Mr. F. J. Evans for his attention on the occasion.

Much might, no doubt, be said, of an extremely laudatory nature, in favour of that paternal wisdom which thus seeks to establish a lasting bond of sympathy and knowledge between the heir apparent to the throne, and the people over whom it will, we trust, one day be his lot to preside; but, at present, we must overlook the merits of the father to point out the rising characteristics of the son. During the sojourn of the Prince of Wales in the retort-house, it was, of course, necessary to exhibit that fiery, and indeed fearful, operation called "drawing the retorts:" a bed of eight retorts was, therefore, chosen and begun with: the workmen, perspiring from heat and labour, and surrounded as usual by smoke, had finished the drawing of five, when Mr. Evans, judging that the process could not be otherwise than highly inconvenient to the Prince, offered to conduct him to another part of the building. "No," said he, with composure and significant firmness, "I should like to see those other three retorts drawn;" and they *were* drawn before he would move from the spot!

This is, we believe, the first visit of British royalty to a gas-work in this country; may it be the prelude to many more, until popular ignorance and prejudice are convinced that a manufactory has no more right to be called a pest-house, than a sanitary inspector has to be regarded as a philosopher.

LORD J. RUSSELL'S RESOLUTIONS UPON THE SUBJECT OF EDUCATION.

There can be little reason to question the influence of education upon every branch of social life; and, indeed, it has always been one of the main principles for which we have contended, that it would be useless to make provisions for the sanitary improvement of a community, in the way of sewers and water supply, if the majority of the members of such community were unable to appreciate the necessity for, or the advantages of, the whole system of civilisation with which such works are connected. That government does its duty the most effectually which teaches people to think and act for themselves; and, to strain the energies of society to overcome in detail the shortcomings of its individual members, or of the smaller bodies politic, in matters connected with their houses and homes, is a far less effectual method of obviating the evil effects of such shortcomings than to spread amongst the most careless the knowledge of common things, which should teach them the nature and extent of their duties. The community, in fact, which is the most educated—using that word in its widest and truest sense—will, we are convinced, be found also to offer the best examples of social organisation even in sanitary matters; for it is a natural tendency—nay, a necessity for the "*mens sana*" to strive to maintain itself "*corpore sano*;" and it is on account of the intimate connection we believe to exist between the state of national education and national comfort, or, in other words, national health, that we would urge Englishmen of all classes to address themselves seriously to the inquiry, as to how it would be possible to diffuse the inestimable blessings of education. Fortunately, the day has gone by when men still disputed whether or not "a little learning were a dangerous thing." Events have gone beyond the reasoners on such subjects, for the class of learning they dreaded has been spread abroad; and now the question assumes the broader and more solemn character of "how the education which must be given shall be made good, sound, and true?"

All that is important in this matter, indeed, lies in this part of the inquiry, for education is a very different thing from learning, or a superficial acquaintance with literature and physical science; and it is essential that before measures are taken to identify the nation with any system, clear ideas should be formed of the object attempted to be achieved. The great error which has been committed, in France especially, in the system of national instruction, consisted in communicating precisely such superficial knowledge, without at the same time teaching the duties of every human being, or inculcating the necessity for sacrificing occasionally the passions of individuals, or even portions of their abstract rights, in order that the great majority of their fellow-creatures might enjoy all that they were entitled to claim. Men cannot live in society without exercising considerable self-sacrifice; and it was precisely because the wonderfully elaborate French system made no provision for the moral education of the nation, that the army of schoolmasters it employed served, in fact, but to diffuse the wild doctrines of Socialism. Knowledge was given, but no deep moral principles were instilled, by which the vain glory that knowledge inspires in weak minds could be controlled; and sad indeed have been the fruits gathered from a seed so rashly sown; fearfully was France made to feel in 1851 that an ill-educated, but slightly informed, nation is one of the most difficult subjects to manage—that learning alone distributed over a nation is not sufficient to guide it to honour or happiness. It is to be feared that the efforts of our Government in this field have not been guided by sounder principles than those upon which our neighbours have acted; and the eagerness with which the doctrines of the Chartists were once adopted, and the readiness to join any cry against the established institutions of the country, must be considered to indicate a state of feeling amongst our poorer classes calculated to inspire anxiety for the future. Nor is the danger from the unsound systems of education prevalent amongst us to be traced amongst the poorer classes alone; those whom it is the fashion to call the middle and the higher classes have of late adopted many of the doctrines of the Socialist school, and have attempted to enforce them in public life, both practically and theoretically. Before, then, we pledge the nation to any course in the attempt to diffuse the blessings of education, it is expedient, as we said before, to form some clear notions on the character of the instruction to be given, and also to define the nature and extent of the intervention of the State in this all-important social problem,

It is worthy of remark, that this educational problem recurs with extraordinary claims on the attention of social philosophers at certain periods in the history of the development of our race, which have a sufficient resemblance in their characteristic phenomena to warrant their being referred to a general law. There was a great move in favour of education in our country about the period of Edward VI., and Elizabeth, just as there was in France about the middle of the reign of Louis XIV., and as there is now throughout the civilised portions of western Europe. At all these epochs men's minds have been violently roused by the destruction of ancient forms of government, and by revolutions in modes of faith, of a nature to shake confidence in established authorities, and to lead to an examination of the principles received, without discussion, at periods when the human intellect pursues a calmer and more normal course. There is a more striking analogy between the state of England in the present day, and that it presented in the 16th century, in the fact that the strange upheaval of society has been, in both cases, ushered in, if it has not even been produced, by changes in the character and extent of our physical knowledge of a very marked and extraordinary character. The discovery of gunpowder, the mariner's compass, the manufacture of paper, and the introduction of the arts of printing and engraving, so extended the sphere of human activity, about the period of the revival of classical literature, that it must cease to be a matter of surprise to the philosopher that the activity so impressed on the human intellect should have displayed itself in the overthrow of old systems of war, of time-honoured forms of church discipline, and even of modes of legislation, as well as of artistic expression. The discovery of America, and the strange perturbation the introduction of its mineral wealth produced in established commercial relations, equally tended to unsettle the livers in those times in their ideas with respect to the duties or destinies of man. We consequently find that the end of the 16th century was marked, throughout western Europe, by the promulgation of Social doctrines as wild and as destructive as any which have been propounded of late years; and that the soundly thinking classes of society were forced to to exert themselves as vigorously then as the Conservatives must be prepared to do now, in order to counteract the effects produced by the promulgation of doctrines which teach men their rights without making them feel that they have also duties to perform, and which practically ignore the fact, that the first and most essential lesson of every form of education ought to be the inculcation of the duty and necessity of self-sacrifice on the part of every member of a civilised community. Of late years, the application of steam power to locomotion by sea and by land; the wonderful strides made in the development of our manufacturing skill; the introduction of the electrical telegraph; and the discovery of the mines of Australia and California, seem to correspond so closely in order of time with the turmoil and upheaval of the belief and consciences of our race (which, however we may be disposed to be "a little blind" to such painful and difficult problems, we must recognise to exist), that it behoves us to examine seriously whether the course of proceeding our ancestors adopted to counteract the evil effects arising from the doctrines of the Anabaptists and the Levellers, ought not again to be employed to counteract the equally dangerous doctrines of the Mormons or the Socialists. How inexplicable are these said recurrences of social aberrations! how very far are we yet from deriving all the benefit from the study of history it might be made to afford, "would men but observingly distil it out!"

There is one difference, and it is a very remarkable one, between the measures adopted about the end of the 16th century and those recently suggested for the purpose of meeting the necessity for education, in our country, at the respective epochs. It consists in the fact, that at the former period private charity was alone appealed to, and set in action, to supply any deficiency in the schools endowed by the State with the lands formerly granted to monastic or ecclesiastical corporations; whereas now it is sought to obtain the funds for a national system of education by means of a compulsory school-rate. In our opinion, the course adopted by our ancestors was far the wiser of the two; and it is strange that, having felt so severely as we have done—especially if the reports and blue books concocted by Lord J. Russell's favourite *protégé*, Mr. E. Chadwick, be worthy of any credence—from the effects of the admission of the principle that every member of a state is entitled to a maintenance at its expense, which, after all, is the basis of our poor-law system; it is strange, we repeat, that our legislators should now seek to adopt, as a further fundamental doctrine of our social organisation, that every member of the state is entitled to an education at the cost of the public, if his parents cannot defray it themselves. It is far, very far, from being our desire to discourage anything like strenuous efforts, individual or collective, for the purpose of removing either distress or ignorance; and we are ready to pay due homage to the motives of those who, in despair of the irregular and fitful action of private charity, invoke the compulsory aid of society. But we fear that the measure thus advocated will not produce the result all ought to desire; and that, although to a certain extent instruction may be advanced by a direct State intervention, yet that the ultimate happiness of society will be endangered by the very means suggested for its advancement.

For they who ponder upon the stern lessons of history must be convinced, from the results of the recognition by our Legislature, of the right to assistance, which the Socialists of France borrowed originally from, and attempted to justify by reference to, our poor laws, that it is a fearful blunder to deprive men of their individual responsibility, and to enable them to cast upon the body politic the duty of effacing the consequences of their own carelessness. How English society resisted for so many years, as it has done, the pernicious influences of such a body of laws must always remain a mystery; but it is certain that about 1830 a very serious demoralisation of the labouring classes had begun to inspire apprehensions of the gravest description amongst our politicians, and it is to be feared that in England, even now, that class is far from being as respectable as men in similar stations are elsewhere. It may be that some corrective had been required for the evils of our system of land tenures; and that, inasmuch as our law acted so as to concentrate property in few hands, and to prevent the mass of the community from attaining the independent position of the pro-

prietors of the soil, it was expedient to cast some charge upon the class thus favoured at the cost of their fellow-citizens. But it is always dangerous to endeavour to counteract one evil by another; and the consequence of our systems of land tenure and of our poor laws has been, that we have a proprietary class endowed with privileges which expose them to unmerited obloquy, whilst our poor have been educated or have grown up with the belief that, let them be as vicious or as improvident as they may, the parish must support them when they will not or cannot support themselves.

Similar results must follow from the establishment of State education paid for by school-rates. Such a system strikes at the root of the principles which we contend ought, before all others, to constitute the basis of education itself—namely, the moral necessity for self-sacrifice on the part of the parents. Provide schools for the poor at the expense of the public, and there will be no need of economy or effort, on the part of the parents, to protect their children from the evils of ignorance; and the very first practical lesson the latter must learn from such an organisation will be, that society is prepared to counteract the results of their own misconduct. It was a divine law, and one which human experience has fully corroborated, that "the sins of the parent should be visited upon the children;" and it will inevitably be found that the attempt to discharge parents from the duty of providing for the education of their children will produce social evils of far more serious character than can even arise from the fact that, as at present, many young persons are deprived of that inestimable blessing. The events which took place in Germany in 1848, and the present tendencies of society in that country, are sad commentaries on the practical results of a compulsory State instruction; and most sincerely do we hope that our legislators will pause ere they substitute the cold, spiritless action of the law, in this all-important detail of social life, for the vital energies of individual character, or the beneficent inspirations of charity. We have ourselves, in the more immediate sphere of our editorial duties, seen so many reasons to dread the effects of the substitution of the collective body, state, or municipality, for the free development of private and individual action, that we have felt it to be our duty to express our opinions upon the application of that principle to a branch of social organisation with which we are but indirectly concerned. Our reason for doing so is, simply because we are convinced that the application of any false principle must be resisted, before it has been carried out to its extreme logical development.

Lord John Russell's resolutions are, however, so marked by the usual characteristics of modern Chadwickian Wiggery, that it may be worth while to call attention to some of their characteristic details. He first asserts, that "it is expedient to revise and consolidate the Minutes of the Committee of the Privy Council on Education;" from which it would appear, that already our attempts at the introduction of administrative centralisation have, in this matter, already produced a result similar to that stated by M. Leon Faucher to have occurred in France, where the result of that system was "to accumulate mountains of paper, which are fabricated by armies of clerks." Yet, in the second resolution, the noble lord proposes to add no less than eighty sub-inspectors to the present inspectors of church schools, besides an indefinite number of sub-inspectors for British, Wesleyan, and other Protestant schools, and also for Roman Catholic schools; so that the funds to be raised compulsorily by rates, from districts certified by these very fine gentlemen to be deficient in adequate means for the education of the poor, and imposed at the discretion of the court of quarter sessions, are partly to be applied for the salaries of a class of men who have hitherto only succeeded, on Lord John Russell's own showing, in embroiling the whole affair in confusion. The clearest part of these resolutions is, that a large number of new places are to be made; that the Government is to meddle still more than ever with the intimate details of private life; that whilst it seeks to procure for itself increased means of patronage and political corruption, it also assumes the discharge of duties which will increase its responsibilities and its dangers to an inappreciable extent. The tendency of all recently created Government boards has been to induce people to look to the State for the remedy to inconveniences which a slight exercise of their individual energy would more effectually supply; and it has apparently been an object with our political leaders to level individuals under the overwhelming power of the mass of society. Perhaps our race may be destined to pass through this phase of organisation, but we are sure that it is a fearful mistake to substitute the unfeeling regulations of any body of laws for the exercise of our natural affections. Equally sure are we that State instruction will never be able to ensure a proper education, although it may serve to create places and patronage; but, on the contrary, that it will contribute to the diffusion of the Socialism under which we already, as a nation, suffer so much, and which especially menaces the security of all property of an origin not distinctly popular. For what purposes was the ecclesiastical property granted by Henry VIII. to the Russell family originally bequeathed? As our legislators do not seem to recognise prescription in municipal property, why should it be retained in other cases? And if the grants of the Crown, purchased by such bodies as the Liverpool Corporation, can be resumed on pretext of public benefit at any epoch, however distant, why should not other grants of property—be it observed, originally destined for educational purposes, and only turned aside from its legitimate employment by the caprice of a savage tyrant—be equally resumed now that a great public benefit is to be effected? The modern Whigs little dream of the logical consequences of the principles they endeavour to apply; but they may find, when too late, that they will not be able to escape their application.

"*Laisser aller, laisser faire,*" is, after all, the true end and object of Government. That is to say, its duty is to ensure the full, fair, and free development of our faculties and energies: when it attempts to guide and control them, it seeks to substitute the erring opinions of man for the unerring instincts implanted by Nature. So, in the matter before us, we hold that a State education must always be an unsound, and nearly always a bad, one. The best method of securing to a community the blessings of a "good, sound, and true education," is, we believe, to remove all restrictions upon establishments intended for that purpose, whether legal or fiscal; to ensure publicity to all proceedings connected with this subject; and to leave the rest to the good feelings of our race, and the sentiment of duty in parents. "Nature," says Montaigne ("Essays," Vol. I., c. 13), "has maternally arranged that the actions she enjoins for our wants should also be sources of pleasure to us; and she invites us to the fulfilment of such duties not only by reason, but also by passion." If the access to a sound education be rendered easy, parents will not fail to avail themselves of it; but if they be dispensed from the necessity of making sacrifices on their own parts, education, properly understood, will suffer in the precise ratio with which instruction is diffused. As for rendering attendance at schools compulsory, it will also, we fear, defeat the great object of improving the moral condition of the people, because it is likely to revolt those it is desired to serve; and certainly the experience of Germany, in this matter, is not such as to induce us to adopt a similar system.

Circular to Gas Companies.

THE Legislature has at length seen the propriety of applying some well-considered principles to all new gas bills, instead of trusting to the hap-hazard system which has hitherto prevailed, by which provisions have been admitted in one case and rejected in another, without any other reasons than the temper of the committee to whom the bills were referred, or the influences brought to bear on them. The committee on unopposed bills, of which Mr. Fitzroy is chairman, has drawn up the following series of clauses, which are, for the future, to be introduced into every gas bill coming before Parliament:—

MODEL CLAUSES TO BE INSERTED IN ALL GAS BILLS.

All the gas supplied by the company shall be of such quality as to produce, from an argand burner having 15 holes and a 7-inch chimney, and consuming 5 cubic feet of gas per hour, a light equal in intensity to the light produced by ten sperm candles of 6 in the pound, burning 120 grains per hour.

The company shall, within six months after the passing of this act, cause to be erected in some convenient part of their works an experimental meter, furnished with an argand 15-hole burner and a 7-inch chimney, or other approved burner and chimney, capable of consuming 5 cubic feet of gas per hour, with other necessary apparatus for testing the illuminating power of the gas.

It shall at any time be lawful for the local board of health (or the improvement commissioners, or the corporation, as the case may be), by order in writing, to appoint some competent person, not being a member, or officer, or servant, of such board (or commissioners, or corporation, as the case may be), to proceed to the works of the company; and the person so appointed, on giving six hours' previous notice in writing to the company, may, at any reasonable hour in the daytime, on producing the said order, enter on the premises of the company, and in the presence of the superintendent, or other officer of the company, make experiment of the illuminating power of the gas, by means of the experimental meter and other apparatus [before men-

tioned; and the company and their officers shall afford all reasonable facilities and assistance to the making of such experiment; and, if it shall be proved to the satisfaction of any *two* justices, not being directors or shareholders of the company, after hearing the parties, that the illuminating power of the gas supplied by the company did not, when so tested as aforesaid, equal the illuminating power by this act prescribed; or that the company, or their officers, refused to afford such reasonable facilities as aforesaid, or hindered or prevented the making of such experiment—in any such case the company shall forfeit such sum, not exceeding £20, as the said justices shall determine.

The costs of and attending such experiment, including the remuneration to be paid to the person making the same, and the costs of the proceedings before the justices, shall be ascertained by such justices; and, in the event of any penalty being imposed on the company, shall be paid, together with such penalty, by the company: but, in the event of the gas being found, when tested, to be of not less illuminating power than is by this act prescribed, such costs shall be awarded to be paid by the local board of health (corporation or commissioners, or the several persons making such requisition as aforesaid, as the case may be), to the company, and shall be paid or levied accordingly.

For places where there are no local boards of health, corporations, or improvement commissioners, an alternative clause is drawn, by which two magistrates are empowered to set the same machinery in motion, upon the demand of a certain number of gas consumers. The words printed in italics are to be definitely fixed by the committees having charge of the respective bills.

ALTERNATIVE CLAUSE.

It shall at any time be lawful for any *two* justices of the [define jurisdiction] not being directors or shareholders of the company, on receiving a requisition signed by not less than *five* consumers of the gas of the company, complaining that the gas supplied to them is not, in their judgment and belief, of the full illuminating power prescribed by this act, if they shall think fit, by order in writing under their hands, to appoint some competent person to proceed to the works of the company; and the person so appointed, on giving *six* hours' previous notice in writing to the company, may, at any reasonable hour in the daytime, on producing the said order, enter on the premises of the company, and, in the presence of the superintendent or other officer of the company, make experiment of the illuminating power of the gas of the company, by means of the experimental meter and other apparatus before mentioned; and the company and their officers shall afford all reasonable facilities and assistance to the making of such experiment: and if it shall thereupon be proved, to the satisfaction of the said *two* justices, after hearing the parties, that the illuminating power of the gas supplied by the company did not, when so tested as aforesaid, equal the illuminating power by this act prescribed; or that the company or their officers refused to afford such reasonable facilities as aforesaid, or hindered or prevented the making of such experiment; in any such case the company shall forfeit such sum, not exceeding £20, as the said justices shall determine.

The substitution of a sperm for a wax candle as the standard light is a change for which we have long contended; and the provision made for the payment of the expenses of testing the quality of the gas, secures the public from any adulteration of the article with which they are supplied, whilst it relieves the company from all chance of factious annoyance.

The leasing powers sought for by the Coventry, Wandsworth, and Gainsborough bills have all been struck out, as well as the precedent sought to be established by the latter, to make the price of gas dependent upon the price of coal. The promoters had agreed to limit it to 5s. per 1000, so long as the price of coal did not exceed 13s. 6d. per ton; the committee, however, fixed it at 5s. 6d., without reference to the price of coal.

An accident of a serious nature occurred early in the month at the works of the Great Central Company, which at one time caused fears to be entertained as to their ability to continue their usual supply of gas, though fortunately, owing to the decreasing consumption and the large number of retorts in reserve, no actual suspension ensued. This is the second metropolitan gas company which has recently been placed in difficulties by the breaking down of their exhausting apparatus in connection with clay retorts, and it should serve as a warning to others similarly situated, whose exhausting machinery is not in duplicate throughout. The accident, as described to us, originated in the breaking of the strap by which the exhauster was driven: the engine, thus relieved from its load, instantly started off, and, before it could be checked, the fly-wheel had acquired too great a velocity for the main-shaft to resist; it consequently broke asunder, and, as the duplicate-engine was connected with the same shaft, the whole exhausting apparatus was thrown out of action, and a loss of gas ensued of upwards of 20,000 feet per hour. No false economy should induce any company to risk its existence by the use of apparatus liable to such a contingency.

The improved position of the metropolitan companies, more especially those on the south side of the Thames, has given rise to a call for a reduction in the price of gas, which, though premature and possibly unreasonable under the circumstances, must not be wholly disregarded. The lessons of the past ought not to be lost upon the future; and they teach every company the necessity of being prepared at all times to submit its affairs to a parliamentary inquiry, and to satisfy the Legislature that their powers have not been abused, or used to the prejudice of the public. One charge often made against them is, that their capital had been imprudently expended, or that dividends have been paid out of capital, which has been thereby swelled into a sum representing more than the actual value of the works. To meet charges of this nature, it would be advisable to have estimates made periodically, by competent and independent persons, of the structural value of the works and assets of companies in whose acts the Gas-Work Clauses Act, 1847, are incorporated, and to limit the dividend to the amount represented by 10 per cent upon such valuation. A practice of this description would at all times give the companies who adopted it a good standing before a parliamentary committee; and it is to this tribunal all parties must ultimately come, where the ground is already occupied by a company with statutory powers.

In Northumberland and Durham, the demand for household coal is very slack; and, deducting freight, brokerage, &c., the coal-owners are not receiving more than from 3s. to 4s. per ton upon coal exported for the London market A meeting of the leading coal-owners has been held during the week, and there appears to be a very general impression among them that coal-miners' wages will have to be reduced 10 per cent. Steam, coke, and gas coals do not rule so low in the market as household sorts, and capitalists do not feel the depression so severely as those who have money sunk in the household coal trade.

Communicated Articles.

EXAMINATION OF THE PROCESS OF MAKING GAS FROM COAL AND FROM WATER.

(*Continued from page* 67.)

We will assume that, in accordance with the composition of the Gillard gas, the water gas obtained by the Galy process might be delivered for consumption with the following proportions of gaseous elements in 1000 mètres:—

Hydrogen, 0·760 mètres, the weight of which is	0·06809	kils.
Carbonic oxide, 0·200 mètres, weighing	0·24978	„
Carbonic acid, 0·020 mètres, weighing	0·03654	„
Steam, 0·020 mètres, weighing	0·04606	„
* Weight of one cubic mètre	0·37347	kils.

Taking into consideration only the heat developed by the combustion of the hydrogen and the carbonic oxide, the whole heating power of the water gas will be—

That due to the hydrogen, 34742×0·06809 kils. ..	2365·93
That due to the carbonic oxide, 2488×0·24978 kils.	622·00
Number of degrees of heat produced by the combustion of 1 cubic mètre of water gas	2988·00

The heating power of the water gas, or the number of degrees of heat developed by the combustion of 1 kilogramme of this gas, would then be about 8400.

To obtain from ordinary fuel the amount of heat which is produced by the combustion of a cubic mètre of water gas, it would be necessary to burn—

0·43 kils. of wood charcoal, the heating power of which is represented by	7000
0·40 kils. of coal, the heating power of which is represented by	7500
0·46 of coke, with a heating power of	6500
1·07 fire-wood, containing still 25 per cent. of water ..	2800

But it is important to remark that these numbers, which indicate the *absolute heating power* of the combustibles, are far from giving an exact idea of their relative values compared with that of water gas, in regard to use for domestic or manufacturing purposes. It must be admitted, indeed—1st, that the stoves adapted for burning coke and charcoal for manufacturing purposes do not apply more than 60 per cent. of the heat emitted by the fuel which they burn; 2nd, that in the reverberatory stoves with grate and open fire-place, the useful effect of the combustible does not exceed one-half of the amount expended; 3rd, that in domestic heating in the fire-places and stoves in our houses, the useful effect of the fuel scarcely exceeds 15 per cent. of the heat expended, and more often still less. If, however, water gas should be applied for the purpose of heating, the combustion of the gas might always be conducted in such a manner as effectually to use the heat either directly or by radiation, with an effect never less than 85 per cent. of the absolute heating power of the gas consumed.

Admitting these results, we then ascertain—

1. That the useful heat supplied by the combustion of 1 cubic mètre of water gas would be represented by—

$$0{\cdot}85 \times 2988 = 2540^{\circ}.$$

2. That the useful heat obtained in a draught stove by the combustion of—

* Equal to 35·29 cubic feet, weighing 13·188 ounces.

0·43 kil. of wood charcoal } would be equal to
0·46 kil. of coke } 0·60 × 2988 = 1793°.

3. That the useful effect obtained in reverberatory stoves by the combustion of—

0·40 kil. of coal } would be equal to
1·07 kils. of fire-wood } 0·50 × 2988 = 1494°.

4. That the useful effect obtained in domestic fire-places by the combustion of—

0·43 kil. of charcoal
0·40 „ of coal } would be equal to
0·46 „ of coke } 0·15 × 2988 = 448°.
1·07 „ of fire-wood

Thus, taking the value of the useful heat due to the combustion of water gas at 1, we shall have the following results:—

Heating value due to 1 cubic mètre of water gas ..			= 1·000
„ „	0·43 of charcoal 0·46 of coke	in draught stoves	$\frac{1793}{2540}$ = 0·705
„ „	0·40 of coal 1·07 of fire-wood	in reverberatory stoves	$\frac{1494}{2540}$ = 0·588
„ „	0·43 of charcoal 0·40 of coal 0·46 of coke 1·07 of fire-wood	in domestic fire-places	$\frac{448}{2540}$ = 0·176

To these striking facts let us add the enormous advantage, in the use of gas, of an instantaneous lighting and putting out of the fire.

We cannot now enter into the consideration of the kind and of the arrangement of the apparatus best fitted for the combustion of water gas in its applications to heating for manufacturing and domestic purposes. It is sufficient to say that practical men in France and in England have already examined this question, the solution of which is certainly possible, and even easy, if required. In any case, the importance of the problem proposed by M. Galy-Cazalet will be fully understood when it is considered that the production of water gas, not only at a less price, but even on the same terms as the cost of the mode of heating at present employed, would necessarily lead to a revolution in manufacturing and domestic usages. This revolution, still greater than that produced in lighting by the introduction of gas, would be accomplished as soon as it should be demonstrated that it is possible to supersede the use of natural fuels; that it is possible to distribute through all the streets of our cities, by a system of pipes similar to that which already winds about under the ground of all the towns lighted by gas, an unexhaustable source of heat, convenient and economical, which we could at will, and instantly, light in our places of business, or extinguish at once without exhausting the supply, or without any perceptible waste. In developing this admirable plan, our colleague has endeavoured to attain the utmost possible limits of production at a cheap rate of this heating gas, the manufacturing results of which promise to be so important. It remains to us to explain a system of production which will leave far behind it all that is at present known, if the hopes which we conceive of it, after examination, should be confirmed by practical experiment.

The Methods and Apparatus proposed by M. Galy-Cazalet for the Production of Water Gas by the Decomposition of Steam injected in a Bath of Molten Cast Iron.

Retaining his cupola, with all the accessory arrangements previously described, M. Galy proposes to continue the operations still further, in the following manner:—The furnace is lighted, and filled with successive charges of coke and pieces of iron, as is customary in foundries. After a given time, the charge of liquified iron falls to the bottom of the furnace filled with incandescent coke. It will be easy to conceive, also, that if required, an arrangement might be made to allow the metal to remain in a melted state during a given time.

The lid of the apparatus is then lowered into the groove of fusible metal, and steam is admitted through the injection-tube—placed now, with its rows of feeding-jets, at the lower part of the apparatus. A portion of this steam, admitted in excess relatively to the mass of liquid which it passes through, is there decomposed. The part which escapes from the first decomposing agent, circulating *per ascensum* through the mass of coke, is, in its turn, decomposed by the action of the red-hot carbon. The water gas thus formed by the double action of the melted metal and of the incandescent coke, escapes through a row of eduction tubes placed at the top of the apparatus, close to the annular pipe that conducts it to the purifiers.

After a certain time, during which the steam does not cease to flow, the cock of the injection-pipe is closed, the lid of the furnace is raised, and the melted metal is run out. The blast is afterwards put in action, and the apparatus receives fresh charges of cast iron and of coke, &c.

Such is, in its remarkable simplicity, the second mode of the production of water gas conceived by M. Galy-Cazalet. We shall endeavour to discuss its merits, announcing at the same time that this invention, original and attractive as it appears, places us on the unstable and always difficult ground of hypotheses and innovations not yet sanctioned by science or by practice. We shall enter on this task, however, with the desire which has hitherto guided us—of avoiding too favourable illusions, and of avoiding deceptions which are too often fatal.

In his process for the production of gas, our colleague thinks he may take for a basis the following data bearing on the system which we are now about to examine:—1000 kilogrammes of molten cast iron, pervaded by a current of steam, would, according to M. Galy, be changed into a fusible substance—an oxide of liquid iron—containing 350 kilogrammes of oxygen, which would liberate 43·500 kilogrammes of hydrogen, or 475 cubic mètres of gas resulting from the decomposition of about 394 kilogrammes of water. Thus M. Galy has assumed that the same reactions take place between the liquid carburet of iron and steam as occur between iron at a red heat and a current of steam. Science admits, under such circumstances, the production of a fusible oxide, which would be composed of protoxide and peroxide of iron, of which composition the formula is $FeO\ Fe^2O^3$. In our opinion, the actions do not take place in this manner; and we have risked an explanation quite different, though, it must be owned, not less hypothetical.

It appears to us, in the first place, that the oxygen in the *nascent state*—such as results from the decomposition of water from below upwards through the liquid carburetted iron—unites immediately with the carbon of the melted iron. In the next place, that the hydrogen, being equally in a nascent state, is substituted for the carbon that is abstracted from the iron, and combines with that metal; that then, and not till after the completion of those two combinations, a certain quantity of the iron unites with the oxygen to form an oxide, more or less fusible, the manufacturing use of which, as regards casting, assumed by M. Galy, appears to us problematical, if not absolutely impracticable. An experiment made by our colleague under our inspection, and with the assistance of two members of your commission, appeared to give some weight to the opinions which we have announced; it is desirable, therefore, to state the circumstances of it and its essentially remarkable results, though yet very incomplete.

In the furnace of a copper-founder an ordinary crucible was charged with cast iron and heated. After having melted 10 kilogrammes of the metal, an earthenware tube was introduced, the end of which touched the bottom of the crucible, and the other end was luted to the emission-tube of a very small steam-generator commonly employed by M. Galy for his laboratory experiments. The jet of steam was continued for forty minutes, and this injection *per ascensum* of the elastic fluid did not occasion any rising of the fused mass, or any ejection of it: a simple boiling on the surface was produced. The gas, which was disengaged in torrents into the air, burnt with a very intense flame. As to the fused mass, it not only preserved its first degree of fluidity during the injection of the steam, but its fluidity seemed to increase so perceptibly that the observers were convinced that the temperature of the mass was increased by a considerable disengagement of caloric, due to the reaction between the steam and the iron. At the end of forty minutes, the steam of the little generator beginning to fail, the operation was suspended, and the metal in the crucible was poured into an ingot-mould. You have seen a specimen of this product which had been polished on one side, and the other side appeared covered with a layer of oxide about the thickness of a millimètre (0·03937 of an inch), of a bluish colour, slightly porous, of a crystalline texture, with a fine grain, and iridescent.

As to the metal itself, what was its composition? what were its exact properties? Was it that of iron carburetted to an intermediate degree between steel and cast iron, or was it that of iron hydrogenated? In the latter case, what would be the proportion of hydrogen? We do not yet know; but what we have seen—what you have observed with us—is the fine-grained texture of this product, and the facility with which it is deeply scratched and notched with the knife. This substance is certainly not *fine metal* nor *fonte mazée;* the fracture of it does not resemble the close grain nor the colour of steel; it is no longer cast iron, but seems, in short, to be intermediate between cast iron and wrought iron; and it certainly has, or rather would have, a higher commercial value than cast iron.

We think we may affirm that, for a long time past—decidedly in Germany, and also in France and England—the idea has been entertained of trying to inject steam on the surface of molten cast iron, to facilitate the refining of the metal; but we are not acquainted with the results of those attempts, and do not even know whether they have been pursued or abandoned.

There is, no doubt, great difference between the experiment we have mentioned and a complete manufacturing process—between the substance obtained fortuitously, without ascertained proportions between the quantity of steam injected and the weight of the cast iron employed, and a definite effect realised under combined and determined conditions ascertained by successive analyses and exact experiments; nevertheless, we cannot help being of opinion that the fusible metal which we have seen dressed with a smoothing-file, scratched with the knife, and impressed with the hammer, must have a greater marketable value than that of cast iron, and must be capable of numerous important manufacturing uses.

Let us now endeavour to ascertain the volume of gaseous products which would result from this process.

We will assume the cast iron to be of the kind obtained from the hot blast, and containing 3 per cent. of carbon. Thus 1000 kilo-

grammes of cast iron would yield 30 kilogrammes of carbon, to be converted into 100 kilogrammes of carbonic acid by the oxygen contained in the steam. The equivalent of the carbonic acid gas would then answer to a consumption of 80 kils. of oxygen, which would result from the decomposition of 89·99 kils. of steam; and there would be set at liberty 9·99 kils. or 111·627 cubic mètres of hydrogen gas.

We do not know in what proportion iron can combine with hydrogen; we are ignorant even whether such a combination can take place. In default of any data in that respect, we will only recall to mind that the experiment before mentioned yielded considerable quantities of inflammable gas; and we should repeat that we assumed, without in any respect supporting or contradicting the hypothesis, that the metal, in losing its carbon, absorbed a certain quantity of hydrogen. We will suppose that 2·5 kils. of hydrogen are disengaged, producing a volume of 83·705 cubic mètres of pure hydrogen: we shall then have to dispose of 972·50 kils. of metal; but we will assume a waste of 10 per cent. due to the oxidation of the iron, and shall only take account of 875 kils. of metal product.

The oxidation of 97 kilogrammes of cast iron has produced bioxide of iron ($FeO\ Fe^2O^3$) by absorbing 36·86 kils. of oxygen from 41·15 kils. of steam, and by setting at liberty 4·60 kils. or 54·300 cubic mètres of hydrogen. We will further assume, as we have before done, that the gas delivered to the gasometer, freed from carbonic acid, will contain 80 per cent. of hydrogen, and 15 per cent. of carbonic oxide; consequently the furnace will have yielded 163 cubic mètres of hydrogen, and 30·56 cubic mètres of carbonic oxide, amounting together to 193·56 *cubic mètres of water gas.* The production of the carbonic oxide will have taken from the mass 10·50 kils. of *carbon*, which must be reckoned as loss. We should further remark that the 19·3 cubic mètres of gas will have carried off, in a state of suspension, 2 per cent. of steam; that is to say, 3·86 cubic mètres, or 3·40 kils.; consequently the weight of the steam to be supplied to the furnace would be 134·50 kils.

There is too much of uncertainty and hypothesis in the problem, however rational it may seem, to allow us to make calorific calculations, the results of which might be stated by the equivalent of heat developed by the combustion of a given amount of coke. The data, however, will allow us to arrive at the cost price of the water gas obtained by the action of a current of steam on a liquid mass of cast iron, by taking account of the consumption of fuel. To estimate it, we will repeat that the melting of 1000 kilogrammes of cast iron in the cupolas of the foundry consumes about 180 kilogrammes of coke, to which we will add, on one side, the 10·50 kils. carried off in the state of carbonic oxide; and on the other, 20 kils., to compensate for the losses of heat which occur either during the change in charging or in the running of the metal. Thus the operation with 1000 kilogrammes of cast iron, and the corresponding production of gas, will occasion a total consumption of 210 kilogrammes of coke.

This terminates the exposition of the modes of producing water gas, and of gas for illumination, which we have examined. We have now to consider the cost of production; but, before entering into that part of the subject, it appears to us to be desirable to make known to you, by a very summary examination of the patents obtained by M. Galy for his processes for making gas, the origin and the succession of the ideas of our colleague. We thought, also, that this examination would serve to direct your attention to the questions of priority which might arise between M. Galy and other inventors.

In a patent obtained on the 12th of September, 1851, for a new mode of producing, without cost, *currents of hydrogen applicable especially to gas illumination*, M. Galy-Cazalet proposed *to decompose water by causing it to pass in a state of steam into a mass of melted zinc.* The patent described and represented *a generator of hydrogen employed by private individuals.* The steam was conducted to the bottom of a crucible, and rose *per ascensum.* The crucible was kept hermetically closed by means of a lid dropping into melted zinc. He used the gas produced for lighting, either by directing a burning jet upon a globule of platinum, or upon a burner composed of a cylinder of graphite, tipped with a capsule of platinum; or by carburising the gas by making it pass, at a high temperature, through liquid hydrocarbons. In a first certificate of addition, applied for on the 12th of May, 1852, and of which we have already spoken, Mr. Galy proposed to substitute for steam the vapour of rosin or any other oxygenised hydrocarbon, observing that the carburetted hydrogen, which he hoped to obtain by this means, would be less expensive than that supplied by the decomposition of steam, because rosin yields about five times as much gas as water from the same weight of zinc. He described and represented the apparatus fitted for the realisation of this process, with its boiler for the rosin, its interior hearth, and crucible for the zinc.

In the same patent, and in the terms we have already quoted, our colleague, after having proposed the substitution of lead for the zinc, expressly describes the passing of the steam through the melted metal, and the decomposition of the excess of steam which might pass, by filtration, through a mass of incandescent charcoal. Foreseeing even the discontinuance of the melted metal, he made his apparatus consist only of a closed vase—in the first instance, an open vertical retort—in which the fuel was brought to a state of incandescence by its partial combustion. The apparatus was afterwards hermetically closed at the moment that the jet of steam to be decomposed was introduced. Thus, on the 12th of May, 1852, M. Galy had described the processes that we have successively examined in all their essential parts; the subsequent modifications, preserving the principles and the original ideas, only related to the arrangements and the mode of fixing the apparatus. A recapitulation, which we have previously noticed, at the end of the patent of 1852, states clearly all to which that patent claimed exclusive property, at the same time that it makes known how much M. Galy had borrowed from the Selligue process, which the patent only intended to improve.

In a certificate of addition applied for on the 17th of November, 1854, M. Galy described the cupola, or Wilkinson furnace, with the essential arrangements, which we have already mentioned in describing the invention of our colleague. He there indicated the intermittent action of the apparatus as we have described it, with the intervals of combustion by means of a blast of air and of a jet of steam, making use of the lost heat to vapourise the water in the generator, combined with the times of charging with coal and its distillation, with all the essential circumstances before pointed out by us. The very complete description accompanying this application of the 17th of November, 1854, leaves no doubt as to the ideas, and as to the means and processes foreseen by the applicant, and especially as regards the combined and successive production, in the same apparatus, of coal gas and water gas. This specification contains besides the following expressions:—"In order to render hydrogen applicable to heating, we have contrived the means of obtaining it without cost. To produce this effect *the furnace is charged with coke and cast iron*, as is done by founders. When the metal begins to melt, the furnace is completely filled with coal, then the top is closed, and the operation proceeds as we have stated."

At length, and by a third addition, the certificate of which was applied for last January (1855)—the copy of which we have not seen, because M. Galy thought that the written account which he communicated to us completely supplied the information—further improvements were made by our colleague, which, if we mistake not, he would indicate in the manner we have done ourselves:—

1. The combined production of coal gas and water gas by means of two cupolas placed side by side.

2. Or the production, distinct and optional, of one or the other of those two gases.

3. Lastly, the exclusive production of gas for heating in a cupola by decomposing steam, by passing it through melted iron without attempting to make coal gas.

It is not uninteresting to add, that M. Galy constructed, in 1852, a portable furnace on the same principles, and operating by the same processes as those indicated in his patents. This apparatus was employed to generate gas for the inflation of balloons. M. Galy has told us that the aëronaut, Deschamps, proposed to construct a portable hydrogen generator from this model to fill his balloon in towns, where there were no gas-works.

The preceding statement will, we hope, enable you to follow, step by step, the origin and the development of the processes which we have hitherto considered, and which we shall now proceed to discuss from a financial point of view.

Part II.

Considerations respecting the Cost Price of Illuminating Gas, and of Gas for Heating, made by the Processes of M. Galy-Cazalet.

Comparison of the cost price of these gases—1st, with those indicated by the gas companies; 2nd, with that which would result from the data established by the Imperial Commission.

The six gas companies which light Paris with gas estimate in the following manner *the cost price of a cubic mètre of gas delivered at the burner*, supposing the gas-works to be placed outside of Paris:—

	Fr.
1. The net cost of a cubic mètre of gas, respresenting the price of the coal consumed, deduction being made for the coke, the tar, and the ammoniacal liquor.....	0·0791
2. Waste of gas in the pipes	0·0267
3. Cost of making, purifying, repair of the ovens and the pipes	0·0644
4. Cost of distribution, and tax on the pipes.....	0·0178
5. Expense of general management	0·0229
6. Octroi on the gas entering Paris	0·0200
7. Interest on capital (not estimated).....	
*Cost of a cubic mètre at the burner	0·2309

Among all the foregoing elements of the cost price of gas, the first is the only one which can be really ascertained by direct experiment. The others cannot be determined exactly without a long and difficult inquiry which the Imperial Commission did not enter on, but which had been previously made at different times by competent and distinguished men. The Imperial Commission limited itself to obtaining the necessary data for arriving at the first of these elements; that is to say, to ascertaining the net cost of the production of one cubic mètre of gas, only taking into account the price of the coal consumed on one hand, and the market value of the solid and liquid products of distillation on the other.

(*To be continued.*)

* Equal to 5s. 6d. per 1000 cubic feet.

Correspondence.

THE CHAIRMAN OF THE METROPOLITAN BOARD OF WORKS.

SIR,—While generally admiring the accuracy of your reports, I am desirous of correcting an error in that of our meeting of the 22nd ult., in which I am represented to have said that "there was some motive for this opposition;" my expression, as far as I can recollect, was, "that any officer quarrelling with Mr. Grant, there must be some cause."

In this remark I made no allusion to any member of the board; therefore could impute motives to no one, my observation being wholly addressed to the fact, that my knowledge and experience of Mr. Grant's character and disposition were such as to enable me to say confidently, that he would be the very last man in that staff to disagree or commence a controversy with any one.

You will therefore perceive that your observations in your leader of the 4th inst., being based on an incorrect report, are scarcely justifiable.

I trust that you will be kind enough to insert this correction in your next number.

J. THWAITES.

Office of the Metropolitan Board of Works,
1, Greek Street, Soho.

ON THE FERTILISING POWER OF BOGHEAD CHARCOAL AND THE REFUSE OF GAS-WORKS.

SIR,—From some recent experiments, I have found that Boghead charcoal, slightly impregnated with the ammoniacal water of gas-works, and mixed with the soil used for greenhouse plants, promotes the healthy and vigorous growth of the latter. Its effects on my cineraria plants are surprising—several of them measuring nearly two feet ten inches in height: their stems and branches being stiff and strong, like those of a shrub, and their foliage very large, of a deep green colour. My hyacinths and tulips, in the greenhouse, also look remarkably healthy. The cinerarias last year were often covered with the aphides, or green fly, and it was necessary frequently to smoke the house with tobacco or paper, in order to destroy them; this year, however, on only two plants have a few been discovered. The coal-tar which last spring I had poured on the surface of my vine-border, and then well mixed with the soil by turning it over with a fork, caused not only the health and good produce of my vines, but appeared to have a wonderful effect in freeing them from the attacks of the red spider. A peach-tree, growing in the same house on the wall, which had sewerage manure given to it, was covered on its leaves, &c., with red spider, and destroyed by them; whilst on the leaves of the vines there was not a red spider to be found. From the above facts, I am led to infer carbonaceous manures conduce to the sound healthy growth of certain plants, which are consequently less liable to the attacks of insects and fungi; and that, according to the proper or improper nutriment which plants receive, so are their *juices* and *leaves* rendered palatable and unpalatable to animalcula, which seek for *azotised* matter as food—their office being, as *scavengers*, to remove those impurities thrown off by unhealthy and decaying plants. It is evident, therefore, that we ought well to consider what effect putrescent and antiseptic manures respectively exert in inviting or preventing disease in plants, as well as the distinct action which each has on the nutritive food and on those peculiar secretions required for their growth.

Putrescent manures dispose some plants—such as the vine, beet-root, and potato—to a greater susceptibility of atmospheric influences, from an unnatural increase in the production of azotised matter or gluten in those plants which require antiseptic carbonaceous manures for the essential formation in them of sugar, glucose, and fecula. A putrescent manure, composed of decaying animal matter—such as dead dogs, cats, pigs, &c.—when put into a vine-border, impregnates the soil with fœtid nauseous matter, and has, to my knowledge, caused the disease in some vines ever since they were planted; whilst an antiseptic manure, composed of lime, rubbish, &c., has prevented any disease in other vines grown in a vinery close by. Putrescent manures contain both *azotised* and *unazotised* matters—the former consisting of *nitrogen* compounds, which supply proteine for the muscular tissues of man and animals; the latter of *starchy*, mucilaginous, and saccharine matters, which furnish *carbon* as a material for respiration and fat (Balfour). The value of putrescent manures is from the great amount of azote contained in them, and are therefore advantageous for the growth of cereal crops; and the latter, when taken as food by man, increase the muscular tissues, &c., as in the case of the Scotchman, who is thin, bony, and muscular from the oatmeal porridge on which he principally feeds. The antiseptic carbonaceous manures, from the increased quantity of starch produced by them in plants, are adapted for the healthy growth of potatoes, which, when taken as food by man, furnish carbon as a material for respiration and fat—as in the case of the Irishman, who is fat and pot-bellied from living chiefly on potatoes. A race-horse, if fed on potatoes, would get very fat, but not muscular, and consequently unfit to race with another horse fed on oats. The experiments made by me last year with four barrels of gas-tar, as a manure for potatoes, on about an acre of arable land, were most beneficial in counteracting the disease—only one potato in *two thousand*, when taken up, being diseased. The tar was poured in a thin stream, out of a large watering-can, into the rows, and then covered over with three inches of soil, on which the sets were planted. The strength of the tar, however, was too great for the first young shoots, a great many of them being killed by it; and it became evident to me that the tar ought to have been put on the surface of the land, and dug or ploughed in before winter. The produce of potatoes in my kitchen-garden, on a plot of ground seventeen yards by twenty-three yards, was at the rate of about eighteen hundred pecks per acre, and was free from disease, with the exception of those rows *near a manure heap*, and some that were growing amongst some artichokes and raspberry-trees. It is now four years since I abandoned the use of farm-yard manure for the cultivation of the potato; and the manures used by me on the above occasion were wood ashes, gas-tar, lime, and sand from the sea-shore containing protoxide of iron. Some very diseased sets, from St. John's, in America, which were sent to see if I was clever enough to get them to grow, &c., produced a very large crop, perfectly free from disease. It is a well-ascertained fact that diseased sets germinate more freely than sound sets, and produce crops free from disease. The dusting of the haulm and leaves with quick lime three or four times during their growth, I find to be most advantageous in preventing the blight. A row of potatoes to which sewerage manure was freely given, had very large haulms, five feet in length; but the tubers were few and small, the best of which, when cooked, were soapy, and of a most disagreeable taste and odour. Potato sets dipped in tar, with the exception of the eyes, produce good crops; but the use of tar for cabbages, unless thoroughly decomposed in the soil, is destructive to them. Now, cabbages contain much *gluten* in them, and therefore grow luxuriously when fed on putrescent manures; whilst the healthy potato, whose cells are well filled with starch, grows well in antiseptic carbonaceous manures. It must be evident, therefore, that what s one plant's food is another plant's poison.

In order to test the value of Boghead charcoal unsaturated with ammonia water, as a manure for potatoes, I have put it in the rows this year with the sets planted in my kitchen-garden, and I purpose using it, pulverised, at the rate of about three tons per acre when planting the sets in the field. I would suggest its use, when saturated with *ammonia water*, as a top-dressing for cereal crops and grass land, and for turnips and mangold wurzel by putting it into the rows at the rate of three tons per acre. As it is a well-known fact that the vine and potato diseases are more prevalent on the *coast* than *inland*, all the experiments tried by me are thoroughly tested, inasmuch as my residence is about half a mile only from the German Ocean.

In the island of Madeira, where the vines have been destroyed by disease, the quantity of wine produced in good years was 25,000 pipes; but in 1852, when the disease manifested itself there, only 500 pipes were obtained, and the wine was so bad that it was made into vinegar.

In the island of Jersey, potatoes were formerly *exported*, but now they are *imported*, the crops there of late years being nearly all lost from disease. The disease first manifested itself here last year amongst those potatoes grown in farm-yard manure; one plot, where pig manure had been used, being entirely lost. The more open and dry the soil is, and free from putrescent manures, the less liable is the potato grown in it to be diseased. Farm yard manure, if used at all, should be dug or ploughed into the land before winter, as, when fresh and undecomposed in the soil, it causes a rapid, deceptive growth in the potato, and predisposes it to disease; such manure increasing the growth of the cells, and a deficiency of starch in them, which causes the waxy taste in potatoes.

The processes of respiration in animals and vegetables are opposed; in the former carbonic acid being eliminated, and in the latter oxygen. An excess of carbonic acid is fatal to man, and so is an excess of oxygen to plants. The purer the atmosphere, the better is it for man and vegetation. There are periods at which diseases, such as catarrhal effects on the human subject, are more prevalent, in certain localities, than at other times, when the quantity of ozone is greater in such localities. On the sea coast the quantity of ozone is greater than inland; and as it is said to be an allotropic condition of *oxygen*, by which, as Faraday states, "it is rendered more energetic in its action," I conceive its presence in excess in a warm moist atmosphere, where the soil has been impregnated with fœtid nauseous matter, may, in such cases, cause the vine and potato diseases. Since the 1st of January, I have found the ozone here, according to the scale of the ten gradations of colour, to range from 5 to 10; whilst at Hull, twenty miles inland, the test papers have indicated a trace of its presence there only once or twice during several months past. I should conceive the *carbon* which comes from the smoke in the chimneys and floats in the atmosphere, and also bad localities, neutralise, in some measure, the ozone in very large towns like London, Manchester, and Birmingham. Last year, on several occasions when the potatoes were attacked with disease here, I remarked that the clouds hung like a dark mist close to the earth, dragging themselves lazily along, the atmosphere being warm and moist, which produced a languid feeling and closeness in breathing totally opposite to those enlivening sensations of the spirits produced by the bright sky and clear day or night, when the exhalations and radiations from the earth pass freely into a higher region of the atmosphere, tending to its purification, &c.

JOHN MALAM.

Holmpton Lodge, March 8, 1856.

SEWAGE MANURE.

SIR,—I have read with pleasure your fifth article on the "Application of Mechanical Means of Engineering Science to Sanitary Improvement," and trouble you with a few remarks on the subject of dealing with the sewage of towns.

From their great increase in population, and the general establishment of water-works, it is daily becoming of greater importance; and is, perhaps, one of the most difficult that the sanitary engineer has to deal with.

The principal desideratum being to prevent the pollution of our rivers, many of which have to be the source of water supply to towns below those which discharge their sewage into them,

The objects to be attained are—

1. That the system be self-supporting; for it is hardly to be supposed that towns will, for such a purpose, go to any great outlay without a prospect of remuneration.

2. That the sewage water be delivered into streams in a clear, limpid state, and free from organic matter.

3. That the salts of ammonia, potash, and soda contained be, as much as possible, abstracted for agricultural purposes.

I altogether ignore the application of sewage in its natural state to land in the neighbourhood of towns, thus to be purified by natural filtration, as I believe such a system to be more objectionable than delivering it direct, and in its natural state, into a moderately abundant stream of water; and, further, I believe that there is little or no advantage in irrigating with sewage over soft water.

What can be more disgusting than the much-vaunted sewage-water meadows at Edinburgh; and, from my examination of them, and comparison with those of pure-water meadows in England, I doubt their superiority.

Take, again, the hose-and-jet system. Surely, this is not one to be adopted by any but amateurs, with its ramifications of underground pipes, hydrants, &c., and its heavy labour items daily recurring.

Will any one assert that such a system as that at Leicester, where the outlay for plant has been £25,000, for a population of about 48,000, comprising machinery driven at high speeds, can be an economical one? I think not; at least, if the poverty of the article to be dealt with, and the constant charge there must be for repairs, be taken into consideration. Then comes the question, does this process deliver the sewage water into the river in a limpid state? and, further, does it retain the greater portion of the salts valuable to the agriculturist? Again, where lime can be obtained at a reasonable price for such a process, can it not also be obtained in a better state for the agriculturist (that of quick lime) at a less cost? And I would further ask, what is the advantageous chemical change to the sewage that takes place by the liming process.

All parties connected with gas know that the foul lime from gas-works does not obtain a higher price than quick lime; and yet this must be an infinitely superior product to that of the Leicester sewage-works.

The system I am now trying is, to form an artificial manure by such substances as the Boghead and peat charcoal, and have no doubt that I shall succeed in making a marketable manure.

Boghead charcoal consists of 30 per cent. of carbon, the rest being silica and alumina. It has also the property of deodorising and decolourizing.

Peat charcoal has been used as a deodoriser in many places; and has also, in many places, failed commercially. Where I have examined the apparently clear water, I have found it has done little else than, from its porosity, retain the organic matter in suspension, allowing the salts in solution to pass.

The Boghead charcoal, although a more difficult filtering medium to deal with, does not only retain the organic matter, but a small per centage of the salts in solution. I would strongly recommend all parties interested in this subject to give the Boghead charcoal a trial. That it is a complete deodoriser there can be no doubt; and that it is a valuable *manure* is evident from its composition. Such cannot be said of lime, which is *barely* allowed the position of a manure by landlord or tenant.

Until we have such men of chemical knowledge as your correspondent, Mr. Lewis Thompson (who has done so much to enlighten engineers on the chemistry of gas lighting), turning their attention to this subject, I do not feel sanguine for the progress of this branch of sanitary improvement; and I do trust that my humble endeavours to direct further attention to this subject, by now addressing you, may lead to a further ventilation of it.

J. HODGSON JONES.

1, *Poet's Corner, Westminster, March* 6, 1856.

Register of New Patents.

1405.—WILLIAM CARTWRIGHT HOLMES, of Huddersfield, in the co. of York, gas engineer, for "*Improvements in the manufacture of gas, and in apparatus employed therein.*" Patent dated June 20, 1855.

This invention relates—

1. To a mode or method of making or generating crude gas, by which economy of time and fuel is combined, and a larger quantity of gas obtained by the charge being worked off more quickly. The retort or vessel in which the coal is distilled is fitted with an internal flue, or draft tube, in order to extend the heating or distilling surface, reduce the thickness of the layer of coal, and remove the necessity of concentrating an injurious amount of heat on the exterior of the retort, in order to penetrate into the centre of the mass. The additional amount of heating surface preferred is about three-fourths of the inner surface of the retort in contact with the coal; by this means it will throw off a charge in about one-half or three-fourths of the time ordinarily required, and with less injury to the vessel itself. The exterior vessel is made cylindrical, that form being strongest; but it may be made any other shape or form, according to circumstances. In cases where the return draft flues are inadmissible, cast-iron shelves or diaphragms are made use of, either horizontal or vertical, cast separate from and fitted loosely into the interior of the retort, so that a large additional amount of heating surface is obtained without injuriously interfering with the exterior form of the retort.

2. To a mode or method in which the air-condenser, washer, coke or breeze scrubber and purifier are combined in one arrangement, thereby ensuring a degree of compactness and simplicity unattainable in disconnected apparatus, as well as avoiding the multiplicity of connecting-pipes. In the arrangement of the purifier of the combined apparatus, a method of changing is adopted, by which the lime or other purifying agent can be removed from one part of the purifier without stopping the action of the other; but this method is only necessary in the larger sizes.

3. To a method of taking off the pressure on retorts by an arrangment of a self-acting hydraulic valve, which removes the necessity for the dip of the present hydraulic main.

4. To a method of generating gas for illumination by the distillation of bituminous coal, peat, oil, resin, and other gas-producing substances, by means of super-heated steam, and afterwards subjecting the products to the action of heat; thereby decomposing the steam, and converting it and the hydro-carbons with which it is loaded into a permanent inflammable gas. By the means of super-heated steam, there is no waste of the material distilled, as in the common method; and, from a more intimate union of the hydrogen with the olefiant, there is a larger quantity and better quality produced. To produce this result, a boiler is employed, capable of producing steam of 70 lbs. or 80 lbs. pressure, and of a size proportionate to the quantity of steam required by the material to be distilled. To this boiler is attached a coil of pipe, having its area and surface arranged or proportioned to the temperature required for distillation. This coil is placed in the furnace or furnace flues, or heated in a separate furnace, as may be found most convenient. A pipe from the coil is attached to the retort or vessel containing the substance to be distilled, which retort is made of boiler plate, or other suitable material, and is surrounded with brick-work, or other non-conducting substance, so as to retain the heat as much as possible; a pipe from the retort connects it with a second one, so arranged as to be heated by the boiler draft, and having a large amount of internal heating surface. The steam, on being generated in the boiler, is made to pass through the coil of pipes, which are previously heated to a bright-red heat, and from which it receives an increase of temperature corresponding to the area of the coil; from thence it passes into the retort containing the substance to be distilled, which it gradually increases in temperature until all its resolvable parts vapourise and pass off with the steam into and through the second retort or vessel, the hot surface of which completely converts the remaining particles of hydro-carbons into inflammable gas; the steam, also, being here decomposed, adds its hydrogen, and increases the production of gas; the resultant gas (and steam, if any) is afterwards led off into suitable condensing and purifying apparatus. By dispensing with the second retort, and having the coil of pipes adjusted to the required temperature, a large quantity of oils and other products may be obtained from coal, and other bituminous substances, peat, &c., which may be collected in suitable vessels, or refrigerators, for future distillation, thereby saving a vast amount of expense and inconvenience in transporting coal and other raw gas-producing material from place to place.

The claim is for—

1. The introduction into a retort or carbonising vessel of a flue or draught tube, made or cast separately from the retort; and also the insertion of shelves or diaphragms, either horizontal or vertical, made or cast separate from the retort, and made to fit loosely in the interior.

2. The mode or method of combining the air condenser, wash vessel, coke vessel or scrubber, and purifier in one vessel or case; and for the method of changing the lime, or other purifying agent, of one part of the purifier of combined apparatus whilst the other is working.

3. The arrangement of self-acting valves for dispensing with the present hydraulic main; and,

4. The distilling of coal, peat, oil, resin, and other gas-producing substances by means of super-heated steam for the purposes of illumination, as all such improvements are herein described.

1992.—WILLIAM ARMAND GILBEE, of 4, South Street, Finsbury, London, gentleman, for "*Improvements in the production of carburetted hydrogen gas.*" Patent dated Sept. 3, 1855.

The claim is for the improved construction of apparatus for distilling coal, and the products of such distillation for the production of carburetted hydrogen gas.

2002.—WARREN DE LA RUE, of Bunhill Row, in the co. of Middlesex, for "*Improvements in treating Burmese naphtha when obtaining products therefrom.*" Patent dated Sept. 4, 1855.

In the specification of a former patent granted to the inventor he described certain processes for treating Burmese naphtha, which consisted in part of subjecting that substance to the action of steam, for the purpose of distilling successively therefrom various products. Now these present improvements consist in subjecting Burmese naphtha to the action of free steam, at a temperature of about 212° Fahrenheit, to drive off the more volatile constituents, and so as to produce a residue of sufficient consistence to be used alone or conbined with other matters for lubricating machinery; and such product is purified by means of dilute acid, and afterwards with weak solutions of alkalies. The acid combines with substances of an alkaline nature and produces valuable products.

The following is the mode of performing the same:—

The Burmese naphtha, or petroleum, is introduced into a suitable vessel, provided with a close cover, and in such quantity as not to more than about half fill it. The vessel is to be provided with means of heating

the charge by a steam coil, or by an external steam jacket; and also with a mechanical stirrer, working through a stuffing-box. When the Burmese naphtha, or petroleum, is melted, about 10 per cent. of its weight is added of a mixture of one part, by volume, of ordinary oil of vitriol of commerce (sulphuric acid) and two parts of water; and the mixture is agitated for about 12 hours. Or, instead of sulphuric acid, the same quantity (10 per cent.) is added of undiluted strong muriatic acid of commerce, which need not, for this purpose, be free from iron and other usual impurities. The action of these acids is to combine with bodies of an alkaline nature, and also with other constituents, and to form with them, in part, a pitchy compound. Nitric acid, even in a very dilute state, is not quite so suitable for this purpose as sulphuric or muriatic acid, as it is liable to form nitro-compounds with some of the hydro-carbons, as has been shown in the specification of a former patent. After the mixture has been allowed to stand in a fluid state a sufficient time for the acid and pitchy residue to subside, the supernatent and partially purified Burmese naphtha is run off, and introduced into a still into which an open steam-pipe passes to within a short distance from the bottom; and into the still is put one part, by weight, of fused caustic soda, or an equivalent of caustic potash, to 100 parts of Burmese naphtha, or as much of a strong solution of either of these alkalies as would contain the same quantity of solid hydrates. Steam is then passed of sufficient pressure to overcome the resistance of the column of fluid, for so long a period as is necessary to drive off those portions of fluid hydro-carbons as vapourise readily in steam of about 212° Fahr., generally five or six hours. These vapours are conducted to a suitable condenser, and the resulting hydro-carbons separated from the condensed water. The alkaline liquid, which will have become gradually more and more dilute, in consequence of the condensation of some of the steam employed, is run off after subsidence; and steam is then again passed amongst the Burmese naphtha for about an hour. After subsidence, and removal of the aqueous portion, the Burmese residue is run off through a strainer, to separate accidental light solid impurities, and is then allowed to settle and cool.

This residue, thus purified, is a very excellent lubricant for machinery, especially for railway carriages, wheel-work, and heavy shafting; and it may also be employed in admixture with tallow, palm-oil, cocoa-nut-oil, or other oily matter; or with potash or soda soap, the proportions of which may be varied. The mixing is effected when the materials are melted, and the compound is to be agitated until nearly cold. It is not possible to state precisely the proportions for such admixtures, as they may be varied almost infinitely, the Burmese purified naphtha rendering the substances named much better lubricants than when they are used alone, especially for the axles of carriages and heavy machinery.

The acid employed in the purification of the Burmese naphtha combines with some bodies of an alkaline nature. When it is desirable to save the alkaloids, the use of muriatic acid is preferred, and the residual acid and pitchy compound are boiled, after removal from the Burmese naphtha, with successive quantities of water, which is filtered off and evaporated so as to drive off the excess of acid; and, there is thus obtained, as a residuum, an impure muriate, or impure muriates, from which the alkaloids can be separated by stronger bases—as potash, soda, lime, or baryta.

1973.—Thomas Dodds, of 53, Wigmore Street, Cevendish Square, London, military and travelling equipage manufacturer, for "*Improvements in the construction of an apparatus for heating all kinds of furnaces with coal or other gases.*" Provisional protection only obtained, dated Sept. 1, 1855.

[An abstract of the provisional protection appeared in Vol. IV., page 219, of this Journal.]

1979.—Alfred Vincent Newton, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in the manufacture of gas for illumination.*" Patent dated Sept. 1, 1855.

This invention relates to improvements in the manufacture of illuminating gas, by substituting for coal and the other substances at present employed to yield such gas, mixtures of peat with certain carbonaceous substances, or peat distilled in conjunction with carbonaceous substances, as hereafter specified.

It is already well known that peat may be made to yield, by destructive distillation, a very large quantity of gas; but up to the present time the gas so obtained is without any commercial value, at least for the purpose of illumination. This arises from the fact that the combustible gas obtained from peat is a mixture of light carburetted hydrogen, carbonic oxide, and hydrogen gases, all of which have but feeble illuminating properties; as peat is, however, a substance abounding in many localities, and as it can easily be obtained at a cheap rate, and as the gas yielded by peat is wholly (or very nearly so) free from sulphur, it becomes a matter of importance to render it available in the process of gas-making.

Although the gas yielded by peat is itself, as already stated, very weak as an illuminating gas, it is not difficult to correct this defect; it is only necessary that it should be charged with a given proportion of some of the denser gaseous hydro-carbons, after which it can be advantageously employed as an illuminative gas. This mixture of the gases is readily effected in consequence of all gaseous bodies following, with respect to the mingling of their particles, a constant law, whereby they have a tendency to diffuse permanently one into the other.

In the process which forms the subject of the present patent, the object is to employ peat as the source of a large bulk of a highly combustible, although not illuminative, gas; and by means of the substances hereafter specified, to charge this combustible but non-illuminative peat gas, with a sufficient quantity of rich carbonaceous gas, to render the whole mixture suitable for commercial lighting purposes.

The substances which are employed as the source of rich gas in this process are the bituminous material known as Trinidad or Barbadoes pitch, and the solid bitumen found in Nova Scotia, New Brunswick (Prince Albert coal); also the substance known as Boghead coal.

The first part of the invention relates to the employment of the above substances in conjunction with peat, as a source of gas. When Trinidad pitch in conjunction with peat is used, the two materials are simply mixed together in the proper portion, and introduced into a common coal-gas retort; the poor gas from the peat, and the rich gas from the Trinidad bitumen, are thus brought into contact in their nascent state, and, mingling together, pass off in union in the hydraulic main, and thence, by the usual course, to the gasholder. When the solid bitumen of Nova Scotia or New Brunswick is employed, the system of distillation, and the kind of apparatus hereafter described, is used, which system is also used for the purpose of distilling peat and Boghead coal or schist conjointly; the latter substances being employed as a source of rich gas wherewith the poor peat gas may be enriched; for it is found that it is not advisable to distil either of these substances in simple admixture with the peat, but that the gas produced is of better quality, and the coke or residue more valuable when the process of carbonisation is carried on in the manner which is described.

The second part of the invention relates to the use of certain arrangements of distillatory apparatus which is found most suitable to the carrying out of this process.

The claim is for—

1. The manufacture of an economic illuminating gas from peat, distilled either in mixture or conjointly with the carbonaceous substances above set forth.

2. The system of distillation above explained, whereby the poor and rich gases are caused to combine before leaving the distillatory apparatus.

3. The use of the apparatus above described for effecting the distillation and admixture of the gases.

2059.—Etienne Charles Zacharie Bouchard, civil engineer, of Paris, for "*Certain improvements in producing gas for lighting and heating.*" Patent dated Sept. 11, 1855.

This invention consists in certain arrangements of apparatus for generating gas from coal, and for employing the waste heat from the fuel used in the distillation thereof to generate steam and hydro-carburetted gases, and in the mixing of one or both of these agents with coal gas at the time of its production.

The claim is for the construction and arrangement of retorts or furnaces and apparatus for generating gas from coal as described, the employment of the waste heat given off from the fuel used in the distillation thereof to generate steam and hydro-carburetted gases, and the mixing of one or both of these agents with the coal gas at the time of its production.

2071.—Abram Longbottom, of 41, Moorgate Street, in the City of London, and Soho Foundry, Leeds, engineer, for "*Improvements in the manufacture of gas when oils or fatty matters are used.*" Patent dated Sept. 13, 1855.

These improvements consist in constructing each of the retorts used with a projection at the bottom convex inwards and concave on the outside. This retort is of the form of a truncated cone, and the bottom is at the smaller end, and is heated at the bottom by a fire.

The oil, or fatty matter, is supplied through a tube which descends through the inner perforated false bottom of the retort, and the oil, or fat, falls on the inner surface of the convex projection above-mentioned, and is vapourised; and the vapours pass through the perforated false bottom, and amongst the heated mass of charcoal and lime mixed together, and then out of the retort for use. The retorts, in place of being cast of ordinary cast iron, are cast of malleable cast iron, and then annealed; by which it will be found that a retort will last longer, and be more effective when in use.

The claim is for—

1. Constructing retorts to be used in the manufacture of gas from oils, or fatty matters, with a projection at the bottom, convex inwards, and concave at the outside; by which means is obtained a more reliable heat for vavourising oil, without the risk of cokeing or carbonising it, and thus obtaining a much larger quantity of gas from a given quantity of oil than can be obtained by any other process.

2. Causing the vapour to filter through a body of lime and charcoal under heat, for the purpose of converting it into gas, and at the same time purifying it; and,

3. Making the retorts of malleable cast iron, and then annealing them, by which they are obtained much more durable and effective.

PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTIONS.

424.—Richard Laming, of Carlton Villas, Maida Vale, Paddington, in the co. of Middlesex, for "*Improvements in purifying gas, in preparing materials useful for purifying gas, and in apparatus to be used in purifying gas, and disinfecting gas liquors or washings.*" Feb. 20, 1856.

432.—William Clibran and Joseph Clibran, of the City of Manchester, machinists, and manufacturers of gas regulators, for "*Improvements in and applicable to apparatus or mechanism for measuring and regulating the flow of gas, and in the mode of constructing parts thereof.*" Feb. 20, 1856.

476.—Frederick Kersey, of 5, Laurie Terrace, St. George's Road, Southwark, for "*An improvement in the manufacture of drain pipes.*" Feb. 25, 1856.

395.—Ebenezer Dobell, of Hastings, in the co. of Sussex, jeweller, for "*Improvements in lamp glasses, or conductors of light.*" Feb. 15, 185 .

403.—Hyam Jacob Hyams, of Stanhope Street, Hampstead Road, in the co. of Middlesex, gas-meter maker, for "*Improvements in the construction of gas meters.*" Feb. 16, 1856.

421.—William Savory, of Gloucester, engineer, and Henry Arkell, of the same place, builder, for "*Improvements in apparatus for the passage of water and other fluids.*" Feb. 19, 1856.

514.—Charles Alexandre de Fonbonne, of Paris, for "*Improved apparatus for the manufacture of coke and for blasting; also for the production and extraction of illuminating and combustible gas, as well as ammoniacal and bituminous matters, part of such apparatus being applicable to the consumption of smoke.*" Feb. 28, 1856.

516.—Richard Archibald Brooman, of 166, Fleet Street, in the City of London, patent agent, for "*Improvements in treating bituminous shale, Boghead, mineral, and other like schistous bodies, in order to obtain various commercial products therefrom.*" Feb. 28, 1856.

NOTICES HAVE BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED PATENTS.

297.—Rudolph Bodmer, of 2, Thaives' Inn, Holborn, in the City of London, for "*An improved lubricating oil.*" Feb. 4, 1856.

424.—Richard Laming, of Carlton Villas, Maida Vale, Paddington, in the co. of Middlesex, for "*Improvements in purifying gas, in preparing materials useful for purifying gas, and in apparatus to be used in purifying gas, and disinfecting gas liquors or washings.*" Feb. 20, 1856.

Legal Intelligence.

SUPREME JUDICIAL COURT OF THE STATE OF MASSACHUSETS.

December, 1855.

JOHN B. HOLLY *v.* THE BOSTON GASLIGHT COMPANY; MARY ANN HOLLY *v.* THE SAME; MARGARET HOLLY *v.* THE SAME.

These three actions of *tort* were brought by Patrick Holly, the father and *prochain ami* of the infant plaintiffs, to recover damages for injuries alleged to have been suffered by them from inhaling gas while lawfully in their father's house, in Boston, on the night of the 26th of January, 1854. The declaration in each action was of the same tenour, and alleged "that at the time of the commission of the grievances hereafter mentioned, the defendant corporation was the owner and possessed of certain gas-pipes laid in South Street, and used by them in conducting gas through said street, and by and to the premises of the said Holly; and at the time aforesaid the defendant was bound to keep said pipes in proper repair and condition, and to keep the gas from escaping therefrom into and upon the premises of the said Holly. Nevertheless, the defendant, well knowing the premises, wrongfully, unjustly, and negligently permitted the said pipes to be and continue out of repair; by means whereof, on the 26th day of January, 1854, large quantities of gas ascended and came unto and into the said premises, and greatly incommoded the plaintiffs in their occupation of said house, and caused the plaintiffs to become sick and enfeebled; by means of all which the plaintiffs have suffered great pain of body and mind, and have become weakened, and have received permanent bodily injuries."—The plaintiffs offered evidence tending to show that during the forenoon of the 26th of January, 1854, a smell of gas was perceived in the premises of Patrick Holly, who keeps a public-house on the corner of South and Kneeland Streets; that this gas appeared to proceed from the next adjoining house, which was of wood, and occupied below as a barber's shop, while the rooms overhead connected with, and were used as a part of, the house of Mr. Holly, which was of brick, and was separated from the wooden tenement by a brick partition-wall. That Mr. Holly, at or about noon, suggested to one Lennon, the occupant of the barber's shop, which was supplied with gas through a separate service-pipe and meter, to notify the defendants of the leak in his premises; that the barber, Lennon, at half-past two o'clock p.m. sent a message to the office of the gas company in Washington Street, that there was a leak in his premises; his shop was numbered 111; upon the bar-room kept by Holly on the corner of the two streets was the number 107, while upon a side entrance to Holly's house, between his bar-room door and the barber's shop, there was no number. Before three o'clock of the same day, two agents of the gas company came to the door of the barber's shop to investigate the cause of the difficulty, and were directed to the cellar in which the meter supplying the shop was kept. Under the barber's shop was a passage-way leading from the street to the rear, in which passage-way was a door opening into this cellar; the cellar contained, besides the barber's meter, wood and coal belonging to Holly; and a door and steps communicated with the kitchen of Holly's house. The door leading from the passage-way into this cellar being fastened, the agents of the gas company were obliged to get access thereto through Holly's kitchen. Having examined the pipes, and satisfied themselves that the leak was not *inside*, these agents went away, first cautioning the domestic in the kitchen to keep the door closed which led therefrom into this cellar, and not to take a light into the same. It was alleged by the plaintiffs that Holly sent a second message to the defendants later in the afternoon; but this was denied by the defendants, and it was not shown what this message was, nor that it was delivered. At six o'clock, two other agents of the gas company arrived at the barber's shop, to ascertain the position of the leak; and, after investigation, found an escape of gas from the street into the above-mentioned passage-way, through a chink in the steps leading down from the side-walk. Some conversation took place on the side-walk between Mr. Holly and these agents, in the course of which he asked—"Are you going to dig for it to-night?" and was answered that, owing to the lateness of the hour and hardness of the ground they should not, but that it would be attended to the next morning. After cautioning the barber to ventilate his shop, and the domestic in Holly's kitchen not to go with a light into the cellar under the barber's shop, and to keep the cellar door shut, these men went away. Mr. Holly put his children, the plaintiffs, to bed in the third story of his house, at the usual hour, half-past eight o'clock—there being at that time some smell of gas in his premises; he burnt his own gaslights as usual till eleven o'clock, when he went up stairs himself. Being awakened afterwards by the smell of gas, he expressed some anxiety lest the children might suffer therefrom, and pulled down the tops of the windows in their chamber, and again retired. Towards morning he was again awakened, and went down stairs for the purpose of ascertaining the source of the influx of gas, and upon his return found his children on the floor, apparently suffering from the effects of the gas, and vomiting. Having carried them down into one of the lower rooms, a physician, Dr. Spring, was called, upon whose advice they were taken into the street, where they shortly after recovered. Two of these children were detained from school in consequence of this inhalation of gas for a day and a half; the third one not at all. One child had been delicate, and had had an affection of the eyes prior to this accident, and it was shown that she was still delicate, and that her eyes were still affected. The doctor's bill amounted to 4 dols. The following morning, about seven o'clock, four men came from the defendants, and in the course of four hours found and repaired the leak, which was occasioned by a fracture of the main in the street, at a point about opposite to the partition wall between Holly's house and the barber's shop.

On the part of the defendants, evidence was introduced tending to show that the main pipe in South Street, in which this break occurred, was of proper material, and originally laid well, out of the reach of ordinary frost; that the weather had been unusually severe, and the ground frozen to the depth of nearly three feet; and therefore the leak was caused by circumstances beyond their control. That on the 26th of January, at the time before stated, they received a complaint, which was entered in their complaint-book by the clerk whose duty it was to attend to such matters, in the following words:—"Lennon, in 111, South Street, leak;" that thereupon this complaint was written upon a slip of paper, and without delay given to a man in their employ, called a fitter or jobber, whose business it was to examine and repair "inside" leaks and other difficulties; that, owing to the great majority of complaints being "inside," it is the custom of the defendants to send an "inside" jobber in the first place in all cases of complaint. In case he should find that the difficulty fell within his department, he repaired it himself; but if the source of complaint proved to be in the street, his duty was to report it at the office of the company, upon which the proper person to attend to street leaks would be despatched to the place at once. It was further shown, as a part of the system of the defendant company, that complaints for leaks took precedence of all others, without exception. That the fitter who went to 111, South Street, very soon satisfied himself that the leak was outside, and consequently not within his department. Nothing was said to him or his companion by Holly, or by his servant, about any leak or smell in Holly's premises. One of the men reported the nature of the leak at the office of the company, and was despatched thence to give information to the "chief of services," named Chittenden, whose duty it was to take charge of leaks in the mains. At this time the company had in their employ five men, each capable of taking charge of a gang of men for finding and repairing street leaks—a duty requiring much judgment and a peculiar skill, to be attained only by long experience; that at the time in question, in consequence of the extreme severity of the weather, there were four street leaks in process of investigation and repair at the same time—a number unprecedented in the experience of the company at any one time. It was shown that Mr. Chittenden had been in the employ of the defendants for eleven years, and was fully competent not only to take charge of every matter pertaining to this accident, but also to form a judgment as to the propriety or necessity of commencing the search for its source by night, rather than postponing the same till daylight. Upon reaching the place whence the "complaint" had proceeded, No. 111, South Street, Mr. Chittenden, having provided himself with a safety-lamp, proceeded to investigate the probable locality of the fracture. Owing to the fastening of the door from the passage-way into the cellar under the barber's shop, as before stated, he was compelled to gain access thereto by means of the door from Holly's kitchen. While in Holly's kitchen he was informed, in answer to his inquiry of the domestic, that no inconvenience was experienced in that house, but was directed towards the south corner of the cellar under No. 111; and upon searching in this cellar for some escape gas which might act as a guide to the source of the leak, he found that the smell was most perceptible in that corner of the cellar nearest to the above-mentioned passage-way; but there was a broken pane in the window of the cellar, which opened upon the side-walk, through which such gas as entered the cellar seemed to escape. Owing to the depth of the frost in the ground, and the lateness and darkness of the night, he deemed it safest and best to postpone opening the street till the following morning; and proceeded to the office of of the company, where he gave the requisite orders to a competent man, by whom the leak was the next morning found and repaired. The ground of his judgment in this matter he stated to be as follows:—That the inconvenience complained of appeared to be in a tenement occupied, not as a dwelling-house, but as a shop; that he was wholly ignorant of any communication between the second story of this tenement and Holly's brick house; but their being a brick partition-wall separating them, he judged them to be distinct houses; that the process of opening ground which is frozen is attended with danger of explosion and fire; that explosions are frequently caused by the pick-axe used in digging striking fire against a stone, and not unfrequently causing damage to the premises, as well as resulting in setting fire to the gas in the main; and that when this accident occurs, and the ground is frozen, no certain and practicable method of extinguishing the flame can be adopted, except to shut off the gas at the main works, which, though occasionally practised by day, would in the night deprive the whole city of light; that the only lamp which can be used, where gas is escaping and mingling with the air, is the safety-lamp, which does not afford sufficient light to enable the workman to avoid striking the stones with his pick-axe.

Mr. Crittenden further testified that the length of time within which a leak is actually found, after the search has once been commenced, affords no criterion or guide upon which a question as to the correctness or otherwise of a prior judgment upon the point, formed upon a view of the locality (before the search commences), can be based—the reason for this being, that, owing to the impenetrable crust spread over the surface of the ground by the frost, the escaping gas is spread in all directions underneath, and any accidental fissure may mislead the workmen as to the locality of the fracture; that this same result is constantly caused by the escape of gas into drains and sewers, by which it is conducted to a point of escape far from the original source of the difficulty. If a break occur in warm weather—a rare occurrence—this trouble can be avoided by boring a succession of holes in the ground with a crowbar, and so leaving apertures through which the gas may escape.

It was suggested by the plaintiffs' counsel that the necessity for causing such universal darkness might be avoided by a system of valves inserted in the mains, by which any given district might be shut off in case of necessity; but it was testified by the defendants' witnesses that, to make such a method fully operative, several thousand such valves would be requisite, which would seriously obstruct the circulation and distribution of gas throughout the city; but that, notwithstanding this objection, the company had already inserted several hundred in the principal thoroughfares.

Mr. C. J. Shaw instructed the jury that this is an action of *tort* under the present Practice Act; that it was what was formerly called an *action on the case*, and could not be considered as an *action of trespass* in any light, as contended by the counsel for plaintiffs; consequently, the rule of law applicable is, that the plaintiffs must show that the injury had been

the direct result of want of *ordinary care* by the defendants, without being contributed to by any negligence of the plaintiffs themselves; that the rule of law in regard to plaintiffs of tender years is, that, inasmuch as they are under the control and guidance of their parents, they must be held responsible for the acts of their parents so far as they relate to themselves; consequently, if he who had charge of these plaintiffs contributed, by his want of ordinary care, to produce this injury to them, the plaintiffs could not recover. That this company were to be viewed in the same light in this action as an individual; and that, while they should not be held accountable for every accident which might result from the use of gas, yet they were to be required to use such care in the management of their business, in the laying and repairing of their pipes, as men of ordinary prudence are accustomed to use in the transaction of their affairs; that the manufacture and use of gas have become so necessary under the increasing rates of oil and other burning matarials, that any other rule than this would be oppressive, and would result in discouraging persons from investing their property in this manufacture.

The jury were further instructed, that there exists an obligation on the part of the consumer of gas, or one incommoded by its escape, to notify the company thereof; that the company could not be reasonably expected to keep watch over all the many miles of pipe laid within the city; and therefore, if after receiving notice they used proper diligence in the repair of the leak (which was for the jury to judge of), they must be held to have used *ordinary care*, and to have done all that the law could require of them; but in this connection it was for the jury to bear in mind that it had not been shown that the defendants had ever received any notice from Holly, but that the complaint had proceeded from the occupant of the next tenement.

Upon the question of whether the plaintiffs or those having control of them had contributed to produce the injury, the jury were instructed that it was for them to decide whether Mr. Holly had acted as an ordinarily prudent father would act, to put his children to bed in a house and in a room so filled with gas, when they might have been either put to bed in the evening, or removed during the night, to the house of their relations, some of whom lived in the same street, where they would have been in safety; and the court instructed the jury, that if a mother attempted to cross a crowded street with her infant in her arms, and the child should be injured through the negligence of the mother, although the person doing the injury might have been negligent also, still the child must suffer the consequences of its mother's want of care; and it would not be competent for that child to maintain an action for damages, on the ground that it was too young to be able to avoid the carriages in the street.

Upon the question of damages, the court said that no certain rule could be laid down to be followed in all cases; that the amount of damages must be proportionate to the injury suffered, if any; and it was no doubt true, that if much pain or anxiety of mind, as well as body, had resulted from this injury, the plaintiffs were entitled to damages therefor.

The jury returned a verdict for the defendants.

Miscellaneous News.

THE METROPOLITAN BOARD OF WORKS.

FRIDAY, MARCH 7.

The board met this day at Guildhall at twelve o'clock, Mr. THWAITES in the chair.

The minutes of the last meeting were read and confirmed.

RESIGNATION OF MR. HUNT.

The CHAIRMAN said, he was sure that every member of the board would deeply regret the fact which he had to announce, viz., that he had received the resignation of Mr. Hunt, one of the most able and active of their members. (Hear, hear.) That gentleman had received a most important appointment, and was compelled, therefore, to relinquish his seat at the board.

The CLERK read the letter conveying Mr. Hunt's resignation, which was ordered to be entered on the minutes.

METROPOLIS LOCAL MANAGEMENT (AMENDMENT) BILL.

The CHAIRMAN informed the board, that during the week he had had a communication with the Government on the subject of the bill now before Parliament, to explain and amend the Metropolis Local Management Act. (Hear, hear.) He had placed himself in communication with the Government for the purpose of ascertaining how far they would be prepared to receive amendments and suggestions from the board, and what would be the latest period at which such amendments and suggestions could be received. It appeared, however, that the Government only contemplated, by the bill introduced by the Attorney-General, to set at rest certain doubts which existed respecting the old and new vestries, and they were not disposed to go further, until alterations and amendments were rendered necessary by the operation of the act. The reference to a committee, which the board had decided upon, would therefore now drop. He further stated, that on the previous day the clerk and he had made a transfer of the funds lying at the Union Bank to the Bank of London, the treasurers of the board.

PRESERVATION OF HAMPSTEAD HEATH.

A deputation from the vestry of St. John, Hampstead, consisting of Mr. Le Breton, Mr. Gurney Hoare, Mr. Cockerill, R.A., Mr. Bockett, Mr. Freshfield, Mr. Hale, and Mr. Toller, the vestry clerk, appeared before the board to urge upon them to adopt measures for securing Hampstead Heath for the recreation of the public. The deputation was introduced by the honourable member for Hampstead, Mr. Turner.

Mr. LE BRETON said, he was the mover in the vestry of the memorial to the board, which he now had the honour to hand in. It was accompanied by a map of the locality on a large scale, for the better information of the board. The memorial, which had been agreed to at a recent meeting of the vestry, stated—"That Hampstead Heath had been for many years a favourite resort of the inhabitants of the metropolis, and was easy of access from nearly every part of it; that the North London Railway now afforded a ready means of approach to the heath from the most densely-peopled districts, including the City of London, Bethnal Green, Spitalfields, Islington, and other places; and that the existing facilities would be still further increased by a new line of railway about to be made, diverging from the North London Railway at Holloway, passing through Hampstead, and having a station contiguous to the southernmost part of the heath. That the convenience of access to the heath, its elevated and commanding position, the extent and beauty of the surrounding scenery, and the freshness and healthiness of the air, pre-eminently fitted it for a place of public recreation and enjoyment; that the continual spread of buildings, and the rapid growth of the population of the metropolis, rendered the preservation of the heath an object of great and increasing importance; that the difficulty experienced in providing for the labouring classes of the metropolis those means of innocent recreation on Sundays which were essential to their health, both bodily and mental, gave to this subject peculiar interest and significance at the present moment; that the memorialists had reason to apprehend that, unless immediate precautions were taken, irreparable damage might accrue, if not to the preservation of the heath itself, at all events to its utility and value to the public; that the heath itself consisted of about 200 acres of land only, and was in some parts narrow and overlooked by eminences in the adjoining fields, the erection of buildings on which would, to a great extent, destroy the beauty of the heath, as well as materially interfere with the circulation of the air; that the only means by which the full advantage and enjoyment of the heath could be permanently secured to the public, were the purchase of the heath itself, together with four plots of adjacent ground, containing about 110 acres. That two of those plots of ground, comprising together about 80 acres, were now vested in Sir Thomas Maryon Wilson, the lord of the manor of Hampstead, as tenant for life, subject to which interest and to the interests of his issue, should he have any, the property was vested in his brother, Mr. John Maryon Wilson, and his issue. That Sir Thomas Maryon Wilson was unmarried, and not having, under the will of his late father, the power of granting building leases over that portion of his estates, the property was now available for agricultural purposes only; but upon his decease the entail would be liable to be cut off, and the impediment to the erection of the buildings, now existing under the will, would then be at an end. That Sir Thomas Maryon Wilson had made several applications to the Legislature for an act of Parliament to give him the power of granting building leases over the above property, but up to the present time without attaining his object. That a bill had been, during the present session of Parliament, introduced into the House of Lords, called "The Leases and Sales of Settled Estates Bill, 1856," the object of which was to enable tenants for life to obtain powers to build upon lands settled in a similar manner to those in question, on obtaining an order from the Court of Chancery for that purpose, which powers, if such bill should become law, might be obtained on an *ex parte* application to the court, without notice to the public, and without the means of their being heard in support of their objections. That the heath itself was of trifling pecuniary value, and with four adjoining plots of land, comprising in all somewhat more than 300 acres, might be now secured for the public at the expense of £100,000, or thereabouts. The memorialists, without desiring to interfere with other projects which had been suggested for the improvement of the metropolis, submitted that the scheme to which they had drawn the notice of the board was of indisputably higher intrinsic importance than any other of a similar description which had been hitherto brought forward; that it could be carried into effect at a comparatively inconsiderable cost, and that there were special and urgent reasons why the design should be carried into execution without dely." The reason why the inhabitants of St. John's had taken up the subject was, not that they thought they had more interest in it than the inhabitants of other parts of the metropolis, but they considered that, as residents on the spot, they were, in a sense, the trustees of the heath for the public advantage. The memorial pointed out that a large part of the heath was waste ground; and though there was no immediate danger of that part being built upon, nevertheless, as the copyholders were not numerous, and there were now great facilities for enfranchising copyhold property, it might, after the lapse of time, be effectually alienated from the public. With reference to the other portions of the ground referred to, it must be obvious that, if built over, the beauty of the heath would be seriously deteriorated, if not entirely destroyed. One important consideration in dealing with this question was, that in its present condition little or no outlay would be required for the public convenience. The heath was also easily accesible from nearly every part of the metropolis, not only by the ordinary public conveyances on the road, but by the railway. It would be practicable, too, at a moderate expense, to connect the heath with Primrose Hill.

The CHAIRMAN here interposed, and remarked that it would be convenient for the deputation, not to go over the points referred to in the memorial, but to confine themselves to any additional information which they could afford to the board.

Mr. LE BRETON bowed to the decision of the chair, and would briefly state that the deputation were happy to come before that representative board with their case. When, on previous occasions, they had had to go before members of the Government, they were told the metropolis would soon have such a board to appeal to. He would not go into further details, but would leave the case in the hands of the board, assured that they would give to it every attention.

Mr. H. L. TAYLOR wished to inquire whether he understood the memorial to state that £100,000 would purchase the 200 acres of which the heath was composed?

Mr. LE BRETON: Upwards of 300 acres.

Mr. H. L. TAYLOR asked whether, in addition to this, the deputation wished the board to make a further purchase?

Mr. LE BRETON said they left that point entirely with the board, contenting themselves by simply submitting it for consideration.

Mr. H. L. TAYLOR: Do you approach the board with the impression that we have the power, by a vote of our own, to do this work?

Mr. LE BRETON: We are aware that you have.

Mr. H. L. TAYLOR: Are you aware that any improvement exceeding in amount £100,000 this board cannot undertake.

Mr. LE BRETON: Yes; except by applying to Parliament.

Mr. H. L. TAYLOR: Do you desire that we should apply to Parliament to enable us to carry out this improvement?

Mr. LE BRETON: Certainly we do.

Mr. H. L. TAYLOR: Have you looked into the act, to ascertain whether this is an improvement which it is within the province of this board to undertake?

Mr. LE BRETON: We have.

Mr. NICHOLAY begged to know whether the vestry of St. John, Hampstead, had taken into consideration, as this was almost a national object, whether the Government ought not to be applied to for assistance out of the consolidated fund?

Mr. LE BRETON, in answer to the honourable member, would say that the vestry of Hampstead thought it desirable that the Metropolitan Board should go to Parliament rather than themselves. They had been to the Ministers on several occasions, and they went as a deputation to Lord Aberdeen, in

1853, accompanied by Sir Benjamin Hall; and on the last occasion of that kind they were told that this board would be an executive for the whole metropolis, and that upon them the consideration of this question would properly devolve.

Mr. H. L. TAYLOR: Have you considered in what way the £100,000 should be raised?

Mr. LE BRETON: We have not gone much into details—we did not wish to intrude into matters which we felt belonged to this honourable board. We could do it if you desire.

Mr. FRESHFIELD: We certainly consider it a metropolitan, rather than a local, improvement, and that it ought to be provided for as such.

Mr. H. L. TAYLOR: Is it your desire that it should be paid for out of a general rate, extending over the whole metropolis?

Mr. FRESHFIELD: Over the whole or such parts as the Board of Works think fit; and we think that it would devolve upon the board, too, to make application for a parliamentary grant, if needed.

Mr. H. L. TAYLOR: Is there such a strong feeling in the district of Hampstead in favour of this improvement, that the inhabitants would be disposed to take upon themselves a large share of the expense of accomplishing it?

Mr. FRESHFIELD: I am not prepared to answer that question. We have not come here to-day with any minute details, but to urge a great metropolitan improvement which we think ought to be undertaken. We are content to leave the question of rating to your graver consideration.

Mr. DAVIS: I see that in your memorial you say that Sir Thomas M. Wilson has applied to Parliament for an act to give him the power of granting building leases over certain portions of the ground which you name. Are you quite sure that his applications relate to those portions?

Mr. FRESHFIELD: We are perfectly right, and are prepared to substantiate our assertions before any committee. The ground is marked Nos. 1 and 2 on the plan.

Mr. DAVIS: Is not that a portion of the property which, under the Finchley Road Estate Bill, he was permitted to enclose.

Mr. FRESHFIELD: Sir Thomas M. Wilson is the owner of about 400 acres, and this is a part of it; it is not a part of the land over which he sought powers to build in 1854 and 1855.

Mr. DAVIS: But do you not say in your memorial that it is?

Mr. FRESHFIELD: No; we say it is part of the 400 acres.

Mr. LE BRETON: You know there have been seven application to Parliament.

Mr. DOULTON rose to order. There was a motion on the paper of business which would come on presently on this very subject.

The CHAIRMAN said, no doubt there was a manifest inconvenience in discussing matters of detail with a deputation; at the same time it was one of those indefinite things that one knew not where to interpose to bring the conversation to a close. A question was put by a member of the board, to which an answer was very properly given; but it would lead to considerable embarrassment of the public action of the board if they entered upon long and minute discussions in such a way. There could be no harm in individual members putting questions on matters of detail, so as it was done with prudence, and with regard to economy of time. (Hear, hear.)

Mr. DAVIS said he held in his hand a document furnished to him by Sir T. M. Wilson, who was one of his constituents. It was the draft of the bill which he introduced for the purpose of obtaining building powers. It was accompanied by a plan, from which it appears that the ground was a mile and a half from Hampstead Heath, and did not interfere at all with that portion of the property.

The CHAIRMAN: I think the question of boundaries should not be entered upon now. There are two other deputations present who are desirous of being heard.

The deputation from the parish of St. Pancras was then introduced by Mr. Wilkinson. It consisted of the churchwardens, Messrs. Farrer and Smith, Major-General Pemberton, and Messrs. Garvey, Brettingham, Streeten, Clarke, Orr, Charles, Keighley, Wedgwood, and Mr. Cook, the vestry-clerk.

Mr. GARVEY said, on behalf of the vestry of St. Pancras, he would state that they agreed generally with the object set forth in the memorial from the parish of St. John, Hampstead; and they thought it was in the highest degree desirable that the open spaces referred to should be preserved for the recreation of the inhabitants of the metropolis at large: but they thought also that, being a metropolitan improvement, it should be carried out by a general rate. They even went further than that; and, believing that not only the inhabitants of the metropolis, but the country generally would participate in the advantage, they advocated the obtaining of a grant from the consolidated fund to carry it into effect. Referring to a question which had been proposed to the Hampstead deputation, he would say that it appeared to him that the Metropolitan Board of Works had ample powers to deal with this question. The 144th section of their act certainly would authorise the execution of such an improvement; and in that clause it was stated, that where it appeared to the board that further powers were required for the purpose of any work for the improvement of the metropolis, or the public benefit of the inhabitants thereof, they might apply to Parliament for that purpose. By the interpretation clause to the act, he found it provided that "The metropolis shall be deemed to include the City of London and the parishes and places mentioned in the schedules A, B, and C to this act," one of which parishes was that of St. John, Hampstead. The adjoining parishes of St. Pancras and St. Marylebone joined with the inhabitants of Hampstead in desiring the preservation of the heath for the recreation of the working classes; but they protested against the expense being provided by a purely local tax, or even by a tax upon the metropolis at large, without help from the consolidated fund.

Mr. Nicholay introduced the deputation from St. Marylebone. It consisted of Mr. Freeth, Dr. Gourley, Mr. Griffiths, Mr. Houghton, Mr. Lewis, Mr. Williams, Mr. Wingfield, Mr. Greenwell (vestry-clerk), and Mr. Scace.

Mr. FREETH said, during the last twenty years it had been a question continually agitated in the metropolis how to secure for its over-crowded population the permanent benefit of Hampstead Heath. The inhabitants of that locality had very properly taken the initiative in the question; and the parish of St. Marylebone, whose representatives in Parliament had always been forward to promote the object, felt bound to attend and support the prayer of their memorial. It was imperatively necessary that the matter should be taken up at once, and, if practicable, disposed of, or very soon there would rise up between the Regent's Park and the Heath one of those disreputable towns which were continually starting into existence in the environs. Looking at the matter in a sanitary point of view, it appeared to him that, as Hampstead was one of the lobes of the lungs of London, it was quite within the province, as he believed it was in the power, of the board to take action in reference to it. The inhabitants felt that they must have the aid of that board, and also the aid of the Chief Commissioner of Crown Lands, to enable them to carry the Regent's Park to the foot of Hampstead Heath; and whenever the board chose to appoint a committee to look into the question, he could show that it would be most easy, and could be accomplished at a comparatively small expense.

The deputations then withdrew.

APPOINTMENT OF DISTRICT SURVEYORS.

The board proceeded to the appointment of surveyors for the districts comprised in the Hamlet of Penge; Plumstead, and Eltham; and Putney and Roehampton. There were fifteen candidates, viz.:—

For PENGE: Messrs. G. Elkington, James Collis, John Tarring, Samuel Hill, and Edwin Nash.

For PLUMSTEAD and ELTHAM: Messrs. James Collis, Lidyard, Eales, and G. B. Williams.

For PUTNEY and ROEHAMPTON: Messrs. Moseley, Lower, Blore, Sancton Wood, Howett, and Stock.

The CHAIRMAN intimated to the board that Mr. Moseley and Mr. Collis were already district surveyors; and, as the places above named were constituted separate districts by the board, those gentlemen were obviously disqualified by their resolution on the subject.

The names of those gentlemen having been struck out of the list, the votes were taken on the remaining candidates, when Mr. Nash was elected for Penge, Mr. Williams for Plumstead, and Mr. Sancton Wood for Putney. Previous to the votes being taken for the latter district, some conversation arose as to one of the candidates (Mr. Lower) having a claim for compensation if not elected, he having been a district surveyor under the old commission. Mr. Lower was called forward and interrogated as to whether, if elected, he would accept the appointment in lieu of compensation; but that gentleman declined to give his assent, as he could form no estimate of the probable value of the appointment, and might incur serious loss thereby.

BYE-LAWS.

A report from the committee on bye-laws was then brought up. It recommended that certain bye-laws, for regulating the business and proceedings at meetings of the board, and for regulating house drainage and street drainage, should be made.

On the motion, that the report be adopted,

Deputy HARRISON said, he considered it was a matter of too much importance to be taken up and discussed at once, especially as some members of the board had not previously seen the recommendations. He would move, that the report be printed, and the consideration thereof adjourned.

Mr. DOULTON seconded the amendment.

The CHAIRMAN agreed with the honourable member, that it was most important that the recommendations should be well considered. He had given orders that copies of the report should be sent to every member of the board, but it appeared to have been only partially done. There were two or three of the recommendations relating to sewerage, which it was very desirable the board should decide upon at once, as some of the districts were waiting for instructions on the subject.

The amendment was then put and carried.

DISCONTINUANCE OF BRANCH OFFICES.

A report from the committee on conferences with vestries was brought up and read. It recommended that the several branch offices be discontinued, and steps taken for disposing of the premises.

On the motion of Mr. WILKINSON, the report was adopted, and referred back to the committee to be carried into execution.

FINANCE COMMITTEE.

The CLERK read a report from the finance committee, containing the following recommendations:—"That the sums specified in the statement submitted to the committee, amounting in the whole to £12,306. 17s., be paid; and that £4500 be removed from the Bank of England and placed at deposit with the Bank of London."

After some discussion the report was agreed to.

LIABILITIES OF PAVING BOARDS.

The CLERK read a memorial from the vestry of St. Pancras, praying that the board would, pursuant to the 180th section of the Metropolis Management Act, 18th and 19th Victoria, chap. 120, apportion the debts of the commissioners of the Foundling Estate between the several parishes of St. Pancras, St. George, Bloomsbury, and St. George the Martyr, in the proportions agreed upon by them.

Mr. WILKINSON moved, and Captain BARNETT seconded, a motion, referring the consideration of the memorial to the conference committee, which was agreed to.

NEW SEWER IN FETTER LANE.

At the last meeting of the board, Mr. R. Taylor called attention to the fact that sewerage works had been commenced in Fetter Lane without the sanction of the board, and it was referred to Mr. Bazalgette to make inquiries and report.

The report was now brought up and read. It referred to a letter received from Mr. Haywood, the engineer to the City Court of Sewers, giving the dimensions, course, and discharge of this sewer, which was stated to be only a rebuilding of an old one, and which he (Mr. Hayward) said could not be called a "main sewer." Mr. Bazalgette submitted that it was for the board to determine whether the 69th clause of their act applied to the City of London. In his opinion, the works in progress in Fetter Lane were necessary, and such as, if applied to, he would have sanctioned.

The CHAIRMAN said the 69th section enjoined—"That no new sewer shall be made without the previous approval of the Metropolitan Board of Works."

Deputy HARRISON: Yes, in any of the places named in schedules A and B; and the City of London is not mentioned, and never was intended to be.

The CHAIRMAN: It is evident that the act never can be carried out unless the City be under the control of the board. That which is applicable to districts is applicable to the City of London; and I cannot at all understand why such disrespect was shown to it. ("Hear," and a laugh.)

Mr. WILKINSON: The interpretation clause states that "the metropolis shall be deemed to include the City of London and the parishes and places mentioned in schedules A, B, and C to this act."

Mr. WRIGHT: I should like our legal adviser to give us his opinion on the subject.

The CHAIRMAN: He has not had time to consider it yet.

Mr. WRIGHT: Then I think the question should be adjourned.

Mr. WARE thought it was not of such pressing importance but that it might safely be deferred. He could see at a glance that the clause referred to in the act of Parliament required great attention. He would therefore move "That the consideration be adjourned, and that it be placed upon the *agenda* for consideration at the next meeting of the board."

Mr. DOULTON seconded the motion. There were several clauses bearing upon the same point, and Mr. Woolrich ought to have time to consider them.

Mr. HAWKES would wish the clerk's attention to be directed to clause 242.

Mr. H. L. TAYLOR said, if the question were adjourned he could only say that nothing would take place in the interim which should be detrimental in any way to the authority of the board or the interests of the metropolis; and that every information in his power would be afforded by the engineer of the City sewers. (Hear, hear.)

Mr. T. H. HALL would fully endorse Mr. Taylor's remarks, and assure the board that, if anything had been done which could be construed into an infringement of the powers of the board, it had been done without any idea that such a question would arise. (Hear, hear.)

The adjournment was then agreed to.

A report from Mr. Bazalgette, on works in course of construction by Messrs. Nicholson for the drainage of their distillery in St. John Street, Clerkenwell, was then brought up and read, as also a report on the state of the collections of charges for default and improvement rates for the month of January 1856.

Some conversation ensued, on a motion by Mr. Hawkes, to receive at this stage of the business an application from the district board which he represented. He stated that they were about to raise money, and they wished to be prepared to meet any claim which the Metropolitan Board might make upon them.

Upon the vote being taken, upon the propriety of interfering with the order of business, the motion of Mr. Hawkes was rejected by 19 to 9.

The CHAIRMAN suggested to honourable members that it would be well for them to urge upon their respective districts to send up their applications earlier. The one referred to by Mr. Hawkes had only been received since the board met, and it was obviously impossible to arrange the paper of business so as to provide for such contingencies.

PROJECTED NEW STREET.

Mr. WILKINSON then moved, "That it is desirable that immediate and active measures be taken to provide for making a new line of street, opening a communication from the west end of Cheapside westward to the Strand and Piccadilly, in or near to the line recommended by the Metropolitan Improvement Commission in their sixth report, more especially the portion thereof between Carey Street and Fetter Lane, inasmuch as building operations of great magnitude are about to be commenced, which will, if completed, materially increase the expense, if they do not altogether prevent the carrying out this important improvement." He said, so far back as the year 1847 this very line of street was reported upon by a committee of the House of Commons as the most eligible and practicable means of forming a communication between the eastern and western portions of the metropolis; and, in consequence of the recommendations of that committee, the requisite notices were given to the inhabitants in the locality. Certain public companies, on the faith that the alterations would be commenced, had purchased property in the vicinity, intending to make frontages in the new street; and from communications which he had received, he was of opinion that they would not be able to defer their building operations much longer. If they proceeded with those works, the cost of making the proposed new street at a future period would be much enhanced. He had also received a proposal from parties who were desirous to see an easterly and westerly communication opened in this district, to purchase the sub-way, which would be of no value to the board, but for which they were willing to give half a million of money, the assumed loss involved in making the new street. Since he (Mr. Wilkinson had given notice of this motion, a committee had been appointed to whom projects of this class should be referred, and he would not, therefore, press this motion further than to say that he should be glad for this matter to be referred to them.

Mr. CORRIE seconded the motion.

Mr. DAVIS thought it would be highly improper to go into these questions of street improvements until some comprehensive plan was before them.

Deputy HARRISON said, there was not a word in the motion about referring this matter to the committee of works; he would therefore move it, by way of amendment.

Mr. D'IFFANGER seconded the amendment.

Mr. WARE objected to the motion and the amendment, both of which, he hoped, would be rejected. On a previous occasion the board had refused to entertain the question of an improvement in Southwark until some general and well-devised plan for the whole metropolis was before them; and it would be extremely unfair to the honourable member (Mr. Collinson) who brought forward that proposal, for the carrying out of which funds were already in existence, if they adopted the motion now before them.

Mr. DOULTON took a somewhat different view of the matter. Had the committee of works been in existence when Mr. Collinson proposed his improvement, it would have been referred at once, and that was the course which ought now to be pursued.

Mr. TURNER supported the amendment, because, instead of being at variance with the resolution come to in reference to Mr. Collinson's proposal, it was in exact accordance with it.

Mr. TAYLOR said, if Mr. Doulton had been present at the last meeting of the board, he would have known that there was then a lengthened discussion on a somewhat similar proposal brought on by the same honourable member, and that it was then agreed to defer the consideration of metropolitan improvements till that day fortnight. The principle then was adopted, that the board should not take up isolated propositions, emanating from individuals, but should wait till some general plan was before them. If they did not act thus, they would find that there was not a district in the metropolis whose representative would not fancy that he could lay special claim to the consideration of the board for an improvement in some part of his locality.

Mr. BURSLEM would be glad to know whether any great scheme of finance was in preparation which would provide for all these projected improvements and alterations. It appeared to him that some clauses in their act were compulsory, and some permissive only. Let them first of all attend to the former, and carry out the works which were positively enjoined upon them, rather than occupy time in debating questions of the nature of that now before them.

Mr. HALL felt that it was not right for them to look at so large a proposition as the present without having some notion that they meant to complete the alteration, not only as regarded the portion between Fetter Lane and Carey Street, but the approaches to it at either end. As no parliamentary notices could be given till next November, the case was not one of such urgency as to warrant the board in departing from the resolution of the previous meeting, to defer the consideration of all metropolitan improvements till Friday next. He did not mean to say, that this was not a much-needed improvement, but, as a very large majority of the board had already expressed an opinion that the new line of street proposed by Mr. Collinson should have their first attention, he earnestly hoped that, on this occasion at least, they would negative both the amendment and the original resolution.

Mr. R. TAYLOR deprecated these discussions on motions for isolated improvements, because they tended very much to increase the estimated value of property on the supposed site of them. Since notice of the present motion had been given, several persons had waited on him to know whether their premises would be wanted. He felt that their first duty as a board was to cleanse the metropolis. (Hear, hear.) This was the most important work they could take up; and, as they were restricted to a certain time in doing it, they should not hamper themselves by undertaking anything else previously.

Mr. HARRIS said, he was obliged to the board for the favourable notice which Southwark had received, and regretted that Mr. Collinson was not present to speak upon the subject.

Mr. WILKINSON briefly replied, and assured the court that he should be quite satisfied if the amendment were adopted.

The amendment and motion were then successively put to the vote and negatived.

PRESERVATION OF HAMPSTEAD HEATH.

Mr. TURNER, in accordance with notice given by him, proceeded to call the attention of the board to the importance of taking proceedings without delay for securing the heath and the adjoining land in question as a place of public recreation for the inhabitants of the metropolis. He said, after the length of time which had been already taken up by Hampstead Heath that day, he would have contented himself by simply reading his motion, were he not deeply impressed with the importance of the subject. He hoped that the presence of the influential deputations from St. Pancras and Marylebone would satisfy the board that the subject was one of sufficient general interest to warrant their giving to it their serious consideration. The inhabitants of Hampstead had taken the initiative in the matter, regarding themselves as in some sense the guardians of the public interests as far as that locality was concerned, and as bound, therefore, to sound an alarm when those interests were endangered. It was not so much for themselves that the preservation of the heath was required, but that it might still be a place of public resort for the inhabitants of the more densely-populated districts of the metropolis. It certainly needed few arguments to support a motion which had for its object to secure for a thickly-peopled city a place of recreation possessing so many natural beauties, and of such easy access from all parts. He had it on the authority of persons who had visited every metropolis in Europe—and his own observation, as far as it went, confirmed the fact—that none of them possessed a suburb having so many natural attractions as Hampstead presented. He could not help feeling that in any other country so beautiful a spot would long since have been secured for the public benefit as a national domain. With respect to its attractions, this was not the place to speak. If any member of the board was ignorant of them, and doubted that they were great, let him go up to the heath on some fine morning or evening, and he would soon find himself in a position which could scarcely be equalled anywhere. The view was most extensive—stretching to the Surrey and Kent hills, the Thames, Windsor Castle, Harrow, and many parts of Buckinghamshire. But there was a more important question than its beauty, and that was, its influence upon the health of the metropolis. Situated on an elevation some four hundred feet above the level of the river, it could not be contended that it did not offer to the denizens of our over-crowded metropolis, who resorted thither in vast numbers on Sunday, advantages in the way of pure air which they could not anywhere else possess in an equally accessible manner. Then he would ask honourable members to consider what was the main object contemplated in the formation of the board? The Metropolitan Board had been constituted for the purpose of adopting measures to improve the sanitary condition of London, and their chief work unquestionably would be that of intercepting sewerage. But this was not their whole duty, and he could conceive of nothing which would better claim to rank next in importance than that of preserving in its immediate neighbourhood a spot which had long been a favourite resort for all classes of the community, and which was, without doubt, one of the most lovely and the most healthy. They were not required by their act to spend upwards of four millions of the public money in order to perform certain feats of engineering skill, and to show how cleverly they could burrow underground, but that they might promote the health of the inhabitants of this great metropolis. What could be more consistent with such an object than that of expending a much smaller sum in securing so large an open space for the public recreation and enjoyment. Then came the question—Was this a matter which pressed, and to which they should give their early attention? He believed that it was: because, although the heath itself might not be in immediate danger of being enclosed, the adjacent ground which overlooked the heath might soon be covered with buildings; and thus, not only would its beauty be entirely destroyed, but the free circulation of air would be effectually impeded. With regard to the heath itself, the public were not secure in its enjoyment. After stating what were the successive steps taken by the lord of the manor to obtain a right to enclose and build upon the heath, the honourable member proceeded to point out that there was a great probability of the ground being ultimately lost to the public, as, upon the death of the present tenant for life, an *ex parte* application to the Court of Chancery might place the long-coveted power in the hands of his successor. He contended that the board had no reason to expect, as had been suggested, that those who possessed rights of common on the heath would fight the battle of the public in the matter. In conclusion, he urged that the tide of population was gradually encroaching upon Hampstead, and in a few years would make a clean sweep over the hill; and then that which was justly regarded as one of the most beautiful and salubrious suburbs of the metropolis, would be as effectually enclosed and built over as though it were in the midst of the town. Believing as he did that the preservation of the heath was of great importance to the health and comfort of the inhabitants of the metropolis, he would move that the question be referred to the committee of works, to examine into and report.

Mr. WILKINSON seconded the motion.

Mr. H. L. TAYLOR opposed the reference, and denied that the object contemplated could be strictly called a metropolitan improvement. It was an isolated case, in which the inhabitants of Hampstead only were interested, although the board had elicited from the deputations that they were not prepared to take upon themselves the expense. As to the estimated cost alluded to in the memorial, he could only say, that he did not believe it would be accomplished for two or three times the amount. He thought that, by referring the matter to a committee, they would be doing a positive injury to the inhabitants, who ought to apply directly to Parliament for the very powers which the board must seek before undertaking the work.

Mr. DOULTON said, it would be well for the board to have their attention drawn from Hampstead Heath to the act of Parliament. He had carefully looked at the subject, and could not agree with those who thought the projected improvement was within their province. They had power to make, widen, or improve, any streets, roads, or ways, for facilitating the passage

and traffic between different parts of the metropolis; and, where further powers were required, the liberty to apply to Parliament for the same. He conceived, therefore, that at present they had no authority to deal with the question; and they ought not to apply to the Legislature for further powers till they had brought into operation those already confided to them.

Mr. Hows thought it was quite within the limits of the act of Parliament. The preamble stated that the act was for the better local management of the metropolis, "and the improvement thereof." This certainly must be considered a part of the metropolis, or else the honourable member opposite (Mr. Turner) would not be a member of the board.

Mr. Crellin said, he was quite sure that this was regarded as a metropolitan improvement in the district which he represented, and which was, perhaps, as far distant from Hampstead as any. He had been requested by every member of the vestry to support it; and, though his was a poor parish, heavily burdened with rates, they did not object to pay their share of the cost.

Mr. Bidgood read a resolution adopted by the vestry of St. James, Westminster, calling upon their representative to support the application at the Metropolitan Board of Works.

Mr. Ware differed entirely from his honourable colleague. The words of the preamble certainly stated that the act was for the better local management of the metropolis, and improvement thereof, but this did not, as he took it, include every scheme which might be brought forward with a view to promote its sanitary well-being. He was confirmed in the view which he took on this subject by the opinion expressed by Mr. Toulmin Smith, who said, in effect, that these improvements extended only to the making and widening of streets, &c. He (Mr. Ware) would have been glad to vote for the reference to a committee, if he did not feel by so doing the board would be travelling beyond their province. Their first business was to cleanse the Thames—their next to improve the thoroughfares of the metropolis. If they referred this question, they would admit the principle that the board had jurisdiction, and would thus mislead the inhabitants of Hampstead.

On the motion of Mr. Corrie, seconded by Mr. Atkins, the debate was adjourned.

MAP OF THE METROPOLIS.

On the motion of Mr. Offor, seconded by Mr. Drew, it was resolved, "That it be referred to the works' committee to examine and report upon the best mode of procuring a map of the whole area within the jurisdiction of this board, defining the boundaries of the various vestries and district boards."

Several reports from the engineer were read and disposed of, and the board adjourned.

Friday, March 14.

The board met this day at Guildhall, at twelve o'clock—Mr. Thwaites in the chair.

The minutes of the last meeting were read and approved.

NEW MEMBER OF THE BOARD.

The Chairman announced that he had received a communication from the vestry of St. George's, Hanover Square, announcing the election of John Leslie, Esq., as a member of the board for that parish; and he had, therefore, the pleasure to introduce Mr. Leslie to the meeting.

Mr. Leslie produced his credentials, and took his seat accordingly.

PUBLIC BATHS AND WASHHOUSES.

A deputation from the Committee for Promoting the Establishment of Public Baths and Washhouses had an interview with the board, for the purpose of presenting a memorial, praying the board to take the subject into their consideration.

The deputation consisted of the Rev. Sir H. R. Dukinfield, Bart., W. Hawes, Esq., and John Bullar, Esq. It was introduced by Mr. Dalton. The memorial stated that the establishment of public baths and washhouses was proved to be an essential sanitary arrangement; and that, in the opinion of the committee, they should be provided for, not by individual parishes, but by the metropolis at large. It referred to the great success which had attended the establishment of such institutions in different parts of London, and urged upon the board to take the matter up, believing, as the committee did, that it was fully within the scope and design of their act of Parliament. If, upon mature consideration, the board felt it desirable, the memorial urged that they should accept from the Legislature permissive powers to increase the number of public baths and washhouses, so as to place their benefits within reach of all portions of the population of London, and to charge for their establishment and maintenance by a metropolitan rate, which the deputation estimated would not exceed a farthing in the pound.

Sir H. R. Dukinfield, in supporting the prayer of the memorial, said he would not waste a single minute in attempting to prove the great advantages to the community from the establishment of public baths and washhouses, because the fact was generally—almost universally—admitted. The object of the deputation was to urge the board to accept permissive powers from Parliament to form such establishments where deemed necessary, and to take under their charge those already in existence, in cases where it was desired. The committee felt that the burden of their support rested heavily on individual parishes, though the benefit was shared by all; and they wished to see them maintained by the metropolis at large. They thought it not impossible that, in some cases, the parishes would feel so seriously the burden of these institutions as at present supported, that, when the seven years had elapsed from the time of their formation, they would give them up altogether, or that they would fall into the hands of those who would have little or no regard for the special interests of the labouring classes. The committee did not wish to interfere with local self-management, if it were the wish of a particular parish; but they thought it might be desirable, in some such cases, to have the assistance of this board in extending the burden of supporting these institutions over a wider district than the parish in which they were located. They did not wish the board to ask for compulsory powers, but to accept permissive ones, if they could be obtained, from Parliament.

The Chairman inquired whether the committee wished to have separate establishments in each parish?

Sir H. R. Dukinfield said that was not their desire, but that there should be one within easy reach of all. There was not one of those already in existence which was exclusively parochial.

The Chairman: It is stated that a rate of a farthing in the pound would provide funds sufficient. Am I to understand that you mean sufficient to meet the wants of the metropolis, or to establish one in each parish?

Sir H. R. Dukinfield: For the wants of the metropolis.

The Chairman: Do you intend to apply to Parliament for the necessary powers, if the board think it desirable?

Sir H. R. Dukinfield: We think it would be more expedient that your board should apply, but we have no objection, if you wish it.

The deputation then withdrew.

Mr. Hawkes said there was another deputation present from the parish which he represented, on the subject of making a thoroughfare from the Brompton Road to the Kensington Road; and he would move that they be now received.

Mr. Chalmers seconded the motion, which, after some conversation, was negatived, no previous notice of the intention of the deputation to attend having been given.

The Chairman said he hoped the deputation would not consider the rejection of the motion as an indication of any want of respect to them, but simply as an expression of the wish of the board to preserve the order of their proceedings.

BYE-LAWS.

A report from the committee on bye-laws was brought up. It suggested that the bye-laws may be conveniently divided into eight parts:—"Part 1. For regulating the business and proceedings at meetings of the board. 2. For regulating the business and proceedings of committees appointed by the board. 3. For regulating the appointment and removal of officers and servants of the board, their duties, conduct, and remuneration. 4. For regulating the construction of new streets and roads. 5. For regulating the construction of new buildings. 6. For regulating house-drainage and street-drainage. 7. For regulating the form and mode of appeals. 8. For miscellaneous purposes, and for carrying into effect generally the objects of the act."

Deputy Harrison said, he thought it would be better to discuss the first part, which related to the regulation of their business, in a committee of the whole board, as it would be inconvenient to do so in public. (Hear, hear.) The sixth part, which related to the regulations for house-drainage and street-drainage, it was very important they should take up at once. He would move that this be taken into consideration first.

Mr. Hall seconded the motion, which was adopted.

The Clerk read the first recommendation of the committee, which was on the construction of new sewers by vestries, &c., viz., "No new sewer shall be made without the previous approval of the Metropolitan Board of Works; and all vestries and district boards proposing to construct new sewers shall, before commencing any works for that purpose, submit to the said board plans of the streets or places in which it is proposed to construct new sewers, drawn upon tracing cloth, to a scale of five feet to the mile, with the position of the proposed sewers shown thereon, and longitudinal sections of such sewers drawn to the same horizontal scale, and to a vertical scale of eleven feet to an inch, with the heights from Ordnance datum to the invert of the proposed sewers figured, and the rate of inclination specified therein. Also cross-sections of the proposed sewers, drawn to a scale of half an inch to a foot, with a statement of the thickness, and a description of the materials intended to be used in their construction."

On the question being put, to agree with the committee in their recommendation,

Deputy Harrison inquired of Mr. Wilkinson how the committee proposed to enforce obedience to this bye-law, without they appended a penalty for the violation of it?

Mr. Wilkinson said it was quite clear that all these bye-laws must be enforced by penalty, but he thought a clause at the end of the regulations would be better than appending a penalty to each. The committee had not considered that point yet.

Mr. Turner said, the rules without the penalty would be comparatively useless. At the same time, if no penalty was attached, offenders would not go unpunished, as they were liable to indictment under the act of Parliament; and this, though a somewhat clumsy mode of dealing with the cases which might arise, would operate as a check.

Mr. Hall said he should not like to impose a penalty upon district boards. He felt sure, that when they had a copy of the rules of this board, they would strictly adhere to them.

Mr. Hawkes hoped no penalty would be enacted till the board found they would not work without.

Mr. Drew thought there should be no penalty, as upon payment thereof the offender could go on with the work.

Mr. Carpmael said there was already a penalty in the act of Parliament, and the board had the power to put a stop to the works which were an infringement, and that power they would enforce. (Hear, hear.)

Mr. Leslie said, as the youngest member of the board, he might perhaps be excused for asking a question. He wished to know whether the board had decided upon the form of all new sewers? It appeared from this proposed bye-law, that vestries and district boards proposing to construct new sewers were to be compelled, before commencing such work, to send to this board certain plans therein named, showing the position of such sewers, with longitudinal and cross-sections, &c. He (Mr. Leslie) thought the first thing the board should do, would be to determine upon the form of all new sewers, their dimensions, and the materials of which they should be built; and that if any parties wished to deviate from the prescribed form, they should set forth in their notice to the board what the difference was. If this were not done, every one might have a different form of sewer.

Mr. Crellin, after quoting the 138th section of the Metropoliton Management Act, said, it appeared to him that the board should first determine what orders they would make for controlling vestries and district boards in the construction of sewers.

After a remark or two from Mr. Hall and Mr. Offor, the bye-law was agreed to.

The second recommendation, which has reference to the abandonment or alteration of sewers, was also adopted. It provides, that "When it shall, at a subsequent period, be intended to abandon wholly, or in part, or to extend, contract, or alter any design for a sewer previously submitted to and approved by the Metropolitan Board of Works, notice in writing of such intention shall be given to the said board, accompanied by plans and sections, as hereinbefore described, showing the extension, contraction, or alteration which may be intended; and no such abandonment, extension, contraction, or alteration shall be permitted without the previous approval in writing of the Metropolitan Board of Works."

The third, recommendation, on the subject of branching drains into main sewers, was, by consent, struck out, it being intimated that the engineer proposed to substitute one in lieu of it.

The fourth recommendation, requiring notice and construction of junctions with main sewers, was read. It is, that "Three clear days' notice in writing shall be given to the Metropolitan Board of Works by a vestry or district board previously to the connection of any sewer or drain with a main sewer; and the necessary junction for that purpose shall be made by such vestry or district board to the satisfaction of the Metropolitan Board of Works."

Mr. CRELLIN was fearful that this rule would cause much delay in the construction of house-drainage works.

Mr. IRVINE took it to apply only to the junction of sewers with mains, and that it would not lead to any inconvenience. (Hear, hear.)

Mr. DOULTON said, he thought that great danger and inconvenience would arise from allowing any one to interfere with the main drains without due notice; and that, therefore, this rule was essential.

Mr. HALL expressed his conviction that this was a very proper provision.

Mr. CHALMERS felt that it would be very inconvenient, that it would be a very roundabout process, and that no good could arise from it. If the board held the vestries and district boards responsible for the proper execution of the work, they would have all the security they ought to accept.

Mr. OFFOR hoped the board would agree to this rule. It struck him that, as the board had now a very accurate plan of all their own sewers, it was a matter of importance that their engineer should have full information respecting every alteration which might be made in them.

The bye-law, as recommended, was then made.

DISTRICT RATES.

The CLERK read a report on the state of the collections on district sewers' rates for February, 1856, and the board proceeded to issue warrants against defaulters.

CLAIMS FOR COMPENSATION.

Mr. DALTON brought up the report of the committee on this subject. It contained the following recommendations:—"That, as a general rule, in cases in which compensation has been awarded to officers by any vestry or district board, and such award has not been appealed against by officers, nor objected to in any memorial to the Metropolitan Board of Works from any dissentient members of such vestry or district board, or from any of the ratepayers of the parish or district by which such compensation is to be paid, such award be confirmed by the Metropolitan Board of Works. That in all other cases, the compensation to be awarded on loss of office be according to the following scale:—For a service not exceeding five years in duration, a gross sum equal to one year's salary; and for every additional year of service up to twenty years, a gross sum equal to one-fifth part of a year's salary, or the equivalent of such sum in a life annuity, calculated in accordance with the Government tables for life annuities. That any case which, in the opinion of the committee, should not be subject to the foregoing rule, be the subject of special consideration by the committee, and the reasons for the conclusions of the committee be specially reported to the board."

On the motion that the first clause be adopted—

Mr. DALTON said the object of the committee was to interfere as little as possible with vestries and district boards. The act of Parliament gave power to those bodies to grant compensation, subject to the approval of this board. The committee thought that, though whenever the necessity arose the board should preserve the power to examine the details of any awards thus made, it was not expedient to do so where the parties were all agreed, and no objection was raised by the ratepayers.

Mr. BURSLEM seconded the motion, as he was convinced that the district boards must understand best what were the merits or demerits of their own officers.

Major LYON agreed that, as a general principle, it was unnecessary to interfere; but as the Board of Works was a court of appeal, and was evidently intended by the Legislature to be such, they ought not to tie their hands, and adopt a principle from which they could not deviate. He would move, as an amendment, to omit the clause altogether.

Mr. FEW seconded the amendment. Every award must, by the act of Parliament, come before them; but he was sure the board would not unnecessarily interfere with the decision of vestries and district boards, where all parties were satisfied.

Mr. H. L. TAYLOR approved of the recommendation. It was an intimation of the views of the committee, without adopting which the board would have to take up each individual case, and deal with it separately.

Mr. D'IFFANGER could not see how it could be said that they were tying their hands by passing the resolution. It was simply laying down a principle for future action, without which each case would require a separate investigation.

Mr. BIDGOOD referred to a case brought before the board a few weeks back, in which the Hackney vestry asked their sanction to an allowance of £60 a year to an officer who had only been fourteen years in their service, and whose highest salary had only been £100. In such a case, although both parties were agreed, and no ratepayer complained, he (Mr. Bidgood) thought the board should interfere.

Mr. BRISTOWE said, if this were merely a recommendation, and not a binding rule, he would have no objection to its adoption; but if they now passed it, they promulgated to the world that, if the parishes and the party seeking compensation could mutually agree on the amount, the board abrogated their power to interfere.

Mr. DOULTON said, if only one ratepayer objected, it would suffice to open the question; but he was of opinion that the vestries were not likely, as a rule, to assent to such an amount of compensation, in comparison to the salary previously received, as in the case referred to by Mr. Bidgood.

Mr. TURNER supported the amendment. If the act of Parliament had directed some means by which every parishioner could have notice of the decision of the vestry, there could be no objection to the motion; but as it was, he thought there would be great facilities for jobbery.

Deputy HARRISON also supported the amendment. There was a provision for the publication of the accounts of vestries annually; but the claims for compensation were to be settled within six months. It was therefore quite possible that an improper amount might be awarded, without the parish being aware of the fact until too late to remedy the error. As such a contingency might occur, the board should retain the power to do justice to all parties.

Mr. DIXON said he felt that he must have regard for the poor ratepayer, who was only able just to keep his head above water, and who ought to be protected from the possibility of having to contribute to so large a scale of compensation as that at Hackney, which was equal in value to a gift of £500.

After a few remarks by Mr. SNOW, Mr. HAWKES, and Mr. IRVINE,

Mr. OFFOR, referring to the Hackney case which had been quoted, said, there were peculiar circumstances in connection with it which the vestry thought justified their award.

Mr. CARPMAEL said, that if they adopted this rule, and two cases came before them in which the amount of compensation awarded was the same, but from which there was an appeal by one, the board would have to deal upon a different principle in each.

Mr. WARE felt that to reject the motion would be to allow the vestries and district boards no discretion in the matter.

Mr. NICHOLAY said, the second recommendation fixing the scale should have been taken first, and then this discussion would have been saved.

The motion was then put and adopted.

Mr. DALTON moved, and Mr. WRIGHT seconded, the next clause, which was opposed by

Mr. D'IFFANGER, who believed that it would do a great injustice to a very deserving class of men. One year's salary was not sufficient compensation for five years' service, in the case of persons who had lost their office through no fault of their own, but by the operation of an act of Parliament. He moved, as an amendment, that the scale be altered to two years.

Mr. BRISTOWE seconded the amendment, more in obedience to the wishes of his constituents than from his own feeling on the question. The difficulty which he foresaw in adopting the clause at all was, that if one parish agreed to give a compensation equivalent to five years, and no one dissented, the board had just agreed that they would not interfere; and yet, perhaps, the next case they would have to deal with would be one in which, there being an appeal, they would award only a one or two years' scale of compensation.

Mr. MISKIN thought the scale should be fixed, not upon the mere salary of an officer, because in many cases the salary was disproportionately low, and the officer's income was made up by fees.

Mr. T. H. HALL said the estimate would, of course, be upon the whole of his emoluments.

Captain BARNETT, on behalf of the committee, said they thought, in discussing this point, that it referred to their own officers only.

Mr. DREW: And in all other cases.

Captain BARNETT: You will see that the next clause is a saving one.

The CHAIRMAN: There is no doubt that the first resolution relates to cases dealt with by district boards and vestries. All other cases would be dealt with under the one now before you.

Mr. DREW: How would it be with the officers under the Building Act?

The CHAIRMAN: They have another court of appeal—the Treasury.

Messrs. HALL, HARRISON, and TAYLOR advocated the omission of this clause altogether; which, after some further conversation was assented to.

The amendment of Mr. D'Iffanger and the original motion were then put and negatived.

Mr. WRIGHT moved the third recommendation. In doing so, he said the committee were placed in a very awkward dilemma. They had had the matter referred to them, and feeling the difficulties which surrounded it, they had asked the board to lay down some principle for their guidance. This the board would not do, but sent the matter to them for reconsideration. They had now brought up a report, and yet the board would not say whether they were right or wrong. Although the second clause had been negatived, the present was quite consistent with the first, which had been adopted.

Mr. H. L. TAYLOR seconded the motion. He fancied that the compensation committee were not being used well, and that the board had taken a false step in passing the first clause. They might, however, safely adopt this, and give notice to rescind the other.

Deputy HARRISON did not think the committee had much to complain of. They had gone beyond their duty, which was to agree to a scale of compensation; instead of which they had come up with a report, the first clause in which said that, whatever the scale fixed upon by the vestries, if all parties were agreed, the board must endorse it.

The motion was then put, and negatived.

ARRANGEMENT OF CONTRACTS.

A report from the Committee of Works and Improvements was read, containing recommendations to the following effect:—"That the general works to be executed under the direction of this board be divided into three contracts—two for the districts north, and one for those south of the Thames—in accordance with the engineer's recommendation; that each contract do include all works within the limits to which the same shall apply, the estimated cost of which shall not exceed £500; that the form of contract submitted to the committee be printed, and that the schedule of prices prepared by the engineer be appended thereto, and that advertisements for tenders be forthwith issued."

The report was agreed to.

ENGINEER'S REPORTS.

A report from Mr. Bazalgette, as to the circumstances under which the sum of 10s. 6d. for a junction was received at the office in Great Alie Street, was read. It stated that the charge was for work actually performed.

The board agreed thereto.

Another report from Mr. Bazalgette was read, as to the works proposed to be executed by the Lewisham District Board, for which they propose to raise a loan on the security of their rates. It stated that the sewers proposed to be constructed were much needed; that he had examined the plans and sections, and found that the estimated cost of construction was £750. He submitted that there was not sufficient in this to guide the board as to the propriety of sanctioning the proposed loan; but the works themselves were such as he should recommend.

After some explanations from Mr. BRISTOWE and Mr. ATKINS, the question was deferred till the Lewisham Board could send in a complete estimate of the specific works to be undertaken, with the remainder of the proposed loan.

JURISDICTION OF THE BOARD IN THE CITY OF LONDON.

At the last meeting of the board, a report from Mr. Bazalgette was read on the construction of a sewer in Fetter Lane, and some conversation ensued as to the powers of the board under the Metropolis Local Management Act, in reference to the construction of sewers within the limits of the City of London. It was ultimately referred to the clerk, as legal adviser to the board, to consider the question, and to give his opinion at the present meeting.

Mr. WOOLRYCH now said: The board, at its last meeting, had under consideration a report from the engineer as to the construction of a sewer in Fetter Lane, of which no notice had been given previously to this board. The disposal of the question was adjourned, and I was directed to consider the provisions of the Metropolis Management Act with reference to the powers of the board in the City of London; and especially to consider whether the 69th section—which declares that "no new sewer shall be made without the previous approval of the Metropolitan Board of Works"—applied equally to the Commissioners of Sewers of the City of London as to the parish vestries and district boards mentioned in schedules A and B to the act. I have examined the act very attentively: I have considered it in conjunction with the provisions of the previous act for the management and control of the sewers in the City of London, and I have come to the conclusion that this particular section, as well as several other sections all tending to the same point, do not apply to the City of London, but are by their terms confined to vestries and district boards only. On a reference to the language of these

sections, my opinion will, I think, be borne out. The 69th section refers to, "The vestry of every parish mentioned in the schedule A to this act, and the board of works for every district mentioned in schedule B to this act," which, it says, shall (subject to the powers of this act vested in the Metropolitan Board of Works) do certain things. It then proceeds to define the duties of these vestries and district boards, giving them power to "improve or alter all or any of the sewers, water-courses, and works which shall be from time to time vested in them, or subject to their order and control;" and then on that there is grafted the proviso, that "no new sewer shall be made without the previous approval of the Metropolitan Board of Works." I apprehend this is limited to vestries and district boards, and does not apply to the Commissioners of Sewers for the City of London. Then there is another section—namely, the 138th—which is very important. The language of that section is to this effect—"The Metropolitan Board of Works shall from time to time, in order to secure the efficient maintenance of the main and general sewerage of the metropolis, make such general or special order as to them may seem proper for the guidance, direction, and control of the vestries of parishes and district boards, in the local, construction, alteration, maintenance, and cleansing of sewers in their respective parishes or districts, and for securing the proper connection and inter-communication of the sewers of the several parishes and districts, and their communications with the main sewers vested in the Metropolitan Board, &c." Now, here the object is defined to be the effective maintenance of the main and general sewerage of the metropolis; it is a large and very important object, but the meaning is, as I apprehend, confined to the vestries and district boards, and does not apply to the Commissioners of Sewers for the City of London; because the concluding words of the section are, that all such orders given by the Metropolitan Board "shall be binding upon such vestries and district boards." I am fortified in my opinion that this class of sections in the act, the general effect of which is to render the sewerage works of the metropolis subject to this board, is limited to vestries and district boards by the state of the law with reference to sewers at the passing of the Metropolis Management Act. At that time, the whole of the sewers in the metropolis were vested in the Metropolitan Commissioners of Sewers and the Commissioners of Sewers for the City of London, and the powers of each within their respective limits were very similar. It is important to consider what alteration in that state of things is effected by the Metropolis Management Act. By the 135th section of that act, all the sewers mentioned in schedule D, and which are described as the main sewers of the metropolis, are placed under the control of the Metropolitan Board of Works—not only those hitherto vested in the Metropolitan Commissioners of Sewers, but also those which were vested in the Commissioners of the City of London. The main sewerage of the City is evidently thus brought under the control of this board; but, so far as this section is concerned, it leaves the local sewers as before—that is to say, under the control of the Commissioners of the City of London, who, in that respect, are placed in the same situation as the parishes and the district boards. Then there are important words in this section defining the powers of the Metropolitan Board, in whom the main sewers are vested. It says, "Such board shall make such sewers and works as they may think necessary for preventing all or any part of the sewage within the metropolis from flowing or passing into the river Thames in or near the metropolis; and shall cause such sewers and works to be completed on or before the 31st day of December, 1860; and shall also make such other sewers and works, and such diversions or alterations of any existing sewers or works vested in them under this act, as they may from time to time think necessary for the effectual sewerage and drainage of the metropolis," &c. Now, I apprehend there is no doubt that all this series of sections are confined to vestries and district boards, and that nothing in them applies to the sewers within the limits of the City of London. I say, therefore, on the subject of the question referred to me, and which is raised in Mr. Haywood's letter, that there is no express provision in the act of Parliament giving control to this board over new sewers to be constructed by the Commissioners of the City of London. But it may be a most important question, upon which I am not at this time prepared to give an opinion, whether there is not a power given to you in the act by which you can pass a bye-law rendering it incumbent upon the Commissioners of the City of London to submit their plans for your approval previous to commencing any new sewer. Though, as I said before, the control is not given in express language, I apprehend it is very apparent that the scope and meaning of that set was to subject all the sewers in the metropolis to the control of the Metropolitan Board of Works; I say that is apparent from the preamble, which states that "it is expedient that provision should be made for the better local management of the metropolis in respect of the sewerage and drainage, and the paving, cleansing, lighting, and improvement thereof." It is also important to consider that the language of the interpretation clause is, that "the metropolis shall be deemed to *include the City of London* and the parishes and places mentioned in the schedules A, B, and C to this act." Then, sir, in considering whether a bye-law can be made by this board, it is requisite to refer the 202nd section, which, after defining the purposes for which bye-laws may be made, viz., for the internal regulation of the proceedings of the districts, vestries, and the metropolitan boards, proceeds to state that the latter board may also from time to time make, alter, or repeal bye-laws for regulating the plans, &c., of streets; and "for regulating the dimensions, forms, and mode of construction, and the keeping, cleansing, and repairing of the pipes, drains, and other means of communicating with sewers," &c.; and concludes with these words—"and generally for carrying into effect the purposes of this act." Now, I think it may very well be contended that, if it can be shown that among those purposes was the maintenance of the general and main drainage of the metropolis, it would not be stepping beyond the intention of the act for this board to frame a bye-law to make it incumbent on the City Commissioners to submit their plans for approval. I think, in the correctness of this view of the case, I am fortified by several other sections. First, I would refer you to section 135, which points to the ultimate aim and object contemplated by the formation of this board, namely, to provide for the efficient maintenance of the main and general sewerage of the metropolis; and also to provide for securing the proper connection and intercommunication of the sewers. These matters would be inadequately provided for, unless the sewers of the City were under the control of the board. After defining the general powers of the board, the section to which I refer says, that "for the purposes aforesaid, such board shall have full power and authority to carry any such sewer or works through, across, or under any turnpike-road, or any street or place laid out as or intended for a street, as well beyond as within the limits of the metropolis;" but this could be performed if, in the case of a sewer which the board required to pass through or under any portion of the City, the control of the City sewers is under another and an independent body. From these considerations I deduce this conclusion, that the scope and aim of the act of Parliament is to give us the general control over all the sewers of the metropolis, without distinguishing those within the limits of the City from those beyond it. There is one more section to which I think it necessary to call the attention of the board, namely, the 242nd, which is a saving clause in favour of the Commissioners of the City Sewers. It says, "Nothing in this act shall divest the Commissioners of Sewers of the City of London of any powers or property vested in relation to such parts of any of the parishes mentioned in schedule B to this act as are within the City of London; nor shall such parts be subject to be rated or assessed by any district board, but shall be subject to all the powers of the Metropolitan Board of Works as other places in the City of London." Now, sir, that is a saving clause in favour of the City. It is no protection to them as against the powers of this board, but is evidently intended to meet and repel the assertion, that some detached parts of parishes within the limits of the City, because under district boards, might be subjected to the powers of those district boards as regards rating. It is to guard the City against supposing that they came under the control of district boards, and not that those parts were exempt from the control of this board. On the contrary, it shows that those parts shall be subjected, like the other parts of the City of London, to the control of the Metropolitan Board, and is tantamount to a declaration that other parts of the City are so subjected. Now, it can hardly, I think, be contended that it was intended by this language to confine the power to the mere question of rating; I rather take it show the intention of the Legislature to subject these parts, as well as the general area of the City, to the control of this board, so far as is necessary for carrying into effect the purposes of this act. I say, then, in conclusion, that there is no section of the act which gives this control over the City of London in express terms; but (though I do not give a decided opinion hereon) I apprehend there is very considerable ground for supposing that it is competent for this board to frame a bye-law, by which it shall be made incumbent on the Commissioners of Sewers for the City of London to submit for your approval the plans for any new sewers which they may propose to construct. If the board should enter upon the consideration of the propriety of making such a bye-law, I shall then be prepared to offer a more positive opinion upon the subject.

Mr. H. L. TAYLOR said, the question thus started was a very important one—viz., whether the Commissioners of Sewers of the City of London were in precisely the same position as the vestries of parishes and district boards. He agreed that Mr. Woolrych's address was a very able one; but he wished it had been in writing, that the board might have something more tangible to deal with. He (Mr. Taylor) contended that there was nothing in the act of Parliament which would justify such a conclusion. The City of London had stood alone in the metropolis in perfecting its sewerage, and it was never intended by Parliament to include the City in the jurisdiction of this board; indeed, the only control, the only power which this board had with regard to the City was in determining and declaring any sewer to be a main sewer which they deemed proper. That was the only question; and if the board would determine whether the sewer into which the Fetter Lane sewer discharged was a main sewer, they would at once bring it under their jurisdiction, but not otherwise. How was it contemplated by the act of Parliament that the engineer to the Commissioners of Sewers should——

The CHAIRMAN interposed on a point of order. The board had a legal adviser, and this was quite a question of law, as to whether or not this came under the meaning of the act. The board must back the opinion of their legal adviser, or set it aside altogether. If they doubted its correctness, it would be for them to consider whether some further advice should be sought; but it would not be a convenient course, after referring a question of this sort to the clerk for his mature consideration, to discuss that opinion as they would any ordinary matter of fact upon which every member was able to form his own opinion. If Mr. Taylor felt that Mr. Woolrych's was an incorrect version, it would be competent for him to move that the opinion of counsel be taken upon the case, and then the board could determine the question.

Deputy HARRISON: The opinion of the clerk is, that the clauses in the act do not apply to the City of London.

The CHAIRMAN understood the opinion of the clerk to be, that there was no express provision in the act; but that he inferred, from reading several sections, that it was within the power of the board to frame a bye-law so as to regulate the sewers of the City of London.

Mr. R. TAYLOR moved, that the consideration of the question stand over, and tha in the meantime the clerk furnish the board with his opinion in writing.

Mr. DOULTON seconded the motion, which, after a few remarks from Mr. HALL, was agreed to.

Mr. WILKINSON postponed his motion for resuming the debate on the question of referring the subject of metropolitan improvements to the Committee of Works and Improvements.

HAMPSTEAD HEATH.

Mr. CORRIE resumed the debate on the motion for referring memorial from the vestry of Hampstead, as to securing Hampstead Heath as a place of public recreation, to the Committee of Works and Improvements to examine into the particulars of the scheme, and to report to the board. The honourable member recapitulated the arguments used against Mr. Turner's motion, and contended that it was within the province of the board to entertain the question; that it was essentially a metropolitan improvement; that it was loudly called for, and could be met without imposing a heavy tax upon the public.

Mr. BRISTOWE would yield to no man, not even the honourable member for Hampstead, in his desire to see the heath preserved to the use of the inhabitants of the metropolis; but he did not think it was so simple a question for the board to deal with as was represented. He would not say that it was altogether beyond the province of the board; but, feeling a degree of uncertainty on the subject, would move that the consideration of the question be adjourned for a specific time; and that, *ad interim*, the opinion of the Attorney-General should be taken as to whether it was within the meaning of their act. (No, no.)

Mr. BEVAN said he represented one of the largest and poorest districts in the metropolis—Bethnal Green—and his constituents, though they had no objection to a park being made at Hampstead, felt, and very strongly objected to, being called upon to help pay for it. ("Hear," and a laugh.) They felt, moreover, that the first duty of the board was to attend to the sewerage of the metropolis; and, as the main thoroughfare in that locality was without a sewer, they considered it was trifling with the time of the board to entertain such motions as the present.

Mr. D'IFFANGER supported the reference. He believed, if the board were tolerably unanimous on the question, the Government would afford them help in carrying out the improvement.

After a few words from Mr. OFFOR in opposition,

Mr. TURNER was heard in reply, and the motion was put and negatived by a large majority.

The consideration of this question occupied the court for a great length of time.

The CLERK read a letter from Sir Benjamin Hall, which was as follows:—

Office of Works, March 10, 1856.

Dear Sir,—By the 135th section of the Metropolis Act of last session, the Metropolitan Board of Works are empowered to make main sewers, for the purpose of preventing the sewage from passing into the River Thames: and, by the 136th section, it is enacted that, before any such works can be commenced, the plans must be submitted to, and approved by, the Commissioners of her Majesty's Public Works and Buildings.

By the 144th section, the Metropolitan Board of Works have power to make, widen, and improve streets, &c.; and, "if it appears to them that further powers are required, for the purpose of any work for the improvement of the metropolis, or for the public benefit of the inhabitants thereof," they must make application to Parliament. The clause then provides that, before the Metropolitan Board of Works commence any such works, the estimated expense whereof shall exceed £50,000, the plans of such works, together with an estimate of the cost of carrying such works into effect, shall be submitted to the Commissioners of her Majesty's Works and Public Buildings; and no such plan shall be carried into effect until the same has been approved by such commissioners; and no such works shall be commenced in cases where the estimated expense thereof shall exceed the sum of £100,000, without the previous sanction of Parliament. The object of these clauses was, of course, to provide, with as little delay as possible, for the purification of the Thames; for material improvement in the thoroughfares of the metropolis; and to provide places of recreation for the public benefit of the inhabitants; and the plans must necessarily require much consideration, especially as regards the great drainage works; and, if you propose to open any thoroughfares, and purchase ground for any open spaces, and require compulsory powers to take the land that may be necessary for such objects, you will have to comply with the standing orders of Parliament, and give the necessary notices in the autumn of the year. I shall be glad, therefore, if you will let me have all the plans that must necessarily be brought before me, and not later than the end of June. I shall then be able to attend to the subject during the session; and there will be ample time for the consideration of any alterations (if deemed desirable), and for the proper notices as required by Parliament; and I beg to assure you that it will at all times afford me the greatest pleasure if I can be of any assistance to the Metropolitan Board of Works in the transaction of those important duties which devolve upon them under the act of last session.

I have the honour to be, dear sir, yours truly, B. Hall.

The Chairman of the Metropolitan Board of Works.

The board then adjourned to Wednesday, the 19th inst.

SOUTH LONDON GAS CONSUMERS' MUTUAL PROTECTION ASSOCIATION.

A Meeting of the Members of this Association was held on the 12th instant, at the Equestrian Tavern, Blackfriars Road, for the purpose of adopting measures calculated to effect a diminution in the price of gas, proportionate to the reduction which had lately taken place in the cost of the raw material. There was a numerous attendance of gentlemen who are large consumers of the gas supplied by the London Gas Company, the South Metropolitan Company, the Surrey Consumers' Company, and the Phœnix Company. At the opening of the proceedings we observed the following members of the association present, but many others arrived subsequently:—Dr. Challice, M.D., president; Mr. T. Evans, jun., vice-president; Messrs. Redfern, Harris, Webb, Mitchell, Cockayne, Weatherly, Fisher, Hancock, Rountree, Smith, Iselton, Reece, Geo. Butterfield, Noad, &c. &c.

Dr. Challice having been called upon to preside,

Mr. Thos. Wingham, secretary, read the following letter, which he had been directed to address to the four above-named companies respectively:—

Duke Street, London Bridge, Feb. 28, 1856.

Sir,—I have been directed to forward you the following copy of a resolution, passed at a general meeting of the above association:—Resolved—"That a deputation ba appointed to wait upon the several gas companies supplying the South London district, to urge upon them the propriety of reducing the price of gas to 4s. per 1000 cubic feet, in consequence ot the great fall that has taken place in the price of coals and iron;" and to request that you will submit the same to the directors of your company, and solicit the favour of an early interview for the deputation appointed for that purpose.—I am, sir, your obedient servant,

Thomas Wingham, Secretary.

To this communication he had received answers from all the companies. The following was the reply made by the Surrey Consumers' Company:—

Surrey Consumers' Gas Company's Office, Rotherhithe, March 5, 1856.

Sir,—I am in receipt of your letter of Feb. 28, containing the copy of a resolution stated to be passed at a general meeting of the South London Gas Consumers' Mutual Protection Association. The directors of this company decline to receive parties in the character of a deputation from the so-called association; but, if any consumers individually desire an interview with the directors upon the subject mentioned in your letter, they can attend the next meeting of the directors, which will be held at these offices on Tuesday next, the 11th instant, at half-past two o'clock in the afternoon.—I am, sir, your obedient servant,

Mr. Wingham. W. P. Boddy, Secretary.

The Phœnix Company stated that they would receive a deputation on Wednesday, the 12th instant, but that that deputation must consist of none but consumers of the gas of the company. The London Gas Company and the South Metropolitan Gas Company expressed their readiness to meet the deputation without any restriction or limitation.

The Chairman said it was now open to the meeting to decide on what course they intended to pursue. He wished to know their pleasure as to what they should do, especially as regarded the Surrey Consumers' Company and the Phœnix Company, who expressed an unwillingness—the one to acknowledge them as a society, and the other to receive any who were not customers of the company. Those companies must have known well that the association was composed of men who, though not all consumers of the gas of any one company, were separately consumers of the gas of the four companies on that side of the river. What the association complained of was, that, owing to the late arrangement made by those companies, which arrangement secured to each of them the business of a certain district, they enjoyed a perfect monopoly; for the consumer, if he became dissatisfied with the quantity or quality, or price of the gas supplied to him, had no alternative—he was completely at the mercy of the company that supplied him. (Hear, hear.) The question for the meeting now to consider was—whether they should decline any further communication with the Surrey Consumers' Company, or meet them on the terms which they proposed.

Mr. Redfern thought they ought to wait upon the Phœnix Company as a society, not as consumers of that company's gas; and, if the company then ignored the society, other steps might be taken.

Mr. Harris concurred in this opinion.

Mr. Weatherly thought, that if they separated themselves, and made the deputation to each company consist of those only who were consumers of that company, they would diminish greatly their moral effect. The companies were united in carrying out their plans and in imposing high prices, and why should not the consumers be united in resisting injustice? The association was a very powerful body, but, if separated into four parts, they would appear very insignificant.

The Chairman inquired whether there was any secret article in the treaty between those companies binding them to charge the same price?

Mr. Redfern said they were all bound to charge the same price.

Some discussion then arose as to whether any notice should be taken of the "uncourteous" letter from the Surrey Consumers' Company; and the opinion generally expressed was, that no answer to that communication should be sent, and that no deputation should wait upon the company.

The Chairman said the Phœnix Company appeared, by their own account, to be in a very prosperous position; their revenue was increasing, and their expenses were diminishing. They were enabled to take 6d. per 1000 cubic feet off the price of gas supplied to their outlying consumers in Blackheath and Clapham, and he thought it only equitable that the company should make the same reduction on behalf of their larger consumers who were nearer home. He thought this circumstance alone would enable them to go before the Phœnix with a greater degree of confidence.

The Secretary said the leakage alone had been reduced during the last year from 35 to something under 20 per cent.

Mr. Redfern: Suppose we do not receive a satisfactory answer from the company, cannot we act upon them through the medium of the vestries with respect to the price charged for lighting the public lamps?

Mr. Evans said that would greatly depend upon the nature of the contracts made.

The Chairman said the Bermondsey district complained of a flagrant violation of the contract made with them by the Surrey Consumers' Company. The illuminating power of the gas was not more than 65 per cent. of what it ought to be, and the lamps were not lighted for a sufficient length of time. Several large warehouse-keepers in that district refused to pay because they had not received a sufficient supply, the pressure being only two-tenths instead to seven-tenths. This deficiency must have been a great inconvenience to business men, especially on Saturday nights. This was the manner in which the Surrey Consumers' Company conducted their proceedings; yet that was the company that so uncourteously ignored a society formed of some of their largest customers. (Hear, hear.)

After some conversation, in which it was generally admitted that the gas of the Phœnix Company was abundantly supplied, and of superior quality,

The following resolution was moved by Mr. Weatherly, seconded by Mr. Cockayne, and carried *nem. con.*:—"That the deputation cannot allow any distinction to be drawn between its members in regard to the source of their supply of gas; and that the members present proceed at once to meet the directors of the Phœnix Company."

The Secretary said, it was worthy of observation that the price of gas in Liverpool had been lowered to 4s. per 1000 feet; and that iron had fallen £3 per ton, and coals from 35s. to 17s. 6d., the latter figure being the market price for this week.

The deputation then proceeded to the offices of the Phœnix Company, where, after entering their names, they were very politely received.

Some conversation arose among the directors as to the admissibility of reporters, but the chairman of the board (J. E. Johnson, Esq.) at once ruled that they should not be excluded. The two gentlemen who attended for the press were, however, entitled to admission as consumers of the gas of the company.

Dr. Challice, on the part of the deputation, stated that probably the board would be surprised at seeing so large a deputation. The cause of this he would explain. When the Gas Consumers' Protection Association had received the very courteous letter of the Phœnix Company—a letter which, by-the-by, contained a sting at the end of it, intimating that none but Phœnix consumers would be admitted—they determined to come as a body, being all gas consumers, and to hold no conference if any of their members were excluded, and the society not duly recognised. He wished the board, therefore, to thoroughly understand that they did not all appear as consumers of the company's gas.

The Chairman: And that part of the request of the directors has not met with your approval?

Dr. Challice: Yes. If the directors had no objection to receiving the deputation, as at present constituted, he would proceed to state the ground of complaint. It was well known to all parties that a short time since the price of gas was increased in consequence of the increase in the price of iron and coals. As the price of those articles had since diminished, the association wanted to know if the directors of the Phœnix Company could hold out any prospect of a corresponding diminution in the price of gas?

The Chairman: We want to know on what grounds you can reasonably expect such a reduction.

Dr. Challice: Coals are now at the same price as when gas was at its lowest charge, and the price of iron is greatly diminished.

The Chairman: If you can make out that, you will make out a strong case for a reduction in the price of gas; but, unfortunately for us, we do not find that to be the case. In 1855, we paid the largest price for coals given for many years—even since 1840. I have a list here of the prices paid since that year, and I find that in 1855 the price is only 1½d. less than it was in one of those years. We are now working under high contracts, and at present we have no means of lowering the price. We are now paying nearly 80 per cent. more for our coals than we did in 1852, when the price of gas was at the lowest figure. With regard to freights, we were paying in 1852 only 5s. 10d., while in last November we were paying 10s., 9s. 6d., 9s. 3d., and 9s. 7d. Iron is, perhaps, a little lower than it was; but lighterage is 20 per cent. more than we were paying in former years. These are the facts of the case, and under these circumstances I do not see how the price of gas is to come down. We would be very glad to have it in our power to lower the price of gas, for we have but one interest in common with the consumers. We are all working in common, and it is our interest to work together. If we derive any benefit from the working of the concern, we are determined that the consumers shall share in it. We have struggled through a long period of immense difficulty, and we have been contented with 4s. 6d. rather than overburden the consumers, although we were making nothing of that price. You cannot find a town in England, not situated on a coal-field, giving the gas so cheap as we do. Indeed, many of the towns upon coal-fields—where the coals are absolutely under the town, and where there can be no expenses for carriage, charge higher prices than we do. We would be very glad to bring our prices down if we could see the slightest prospect of giving the consumers a good article at the same time. There can be no use in reducing the price and giving an article that is good for nothing. We have improved the quality of our gas 15 or 20 per cent. We have a gentleman appointed as tester of the quality of the gas who is thoroughly independent of us, who tests it when he pleases and how he pleases, and his reports show that we have improved the quality at least 20 per cent. Last week his report showed that the illuminating power was equal to 17·10 sperm candles.

One of the Deputation: He tests it at the works?

Mr. Thomas Gibbs, the deputy-chairman: He tests it wherever he pleases. We never interfere with him.

Dr. Challice: It is a matter of notoriety, that although reports from testers would show an improvement, that the Surrey Consumers' Company have fallen very far short in practice of what they state in their reports; and that while they represent the quality of the gas as improving, in many large rooms, where there are many burners, there is little or no light.

Mr. Gibbs: That observation does not apply to us. Whatever sins of our own we may have to answer for, I hope you will not make us responsible for the sins of others.

After some general conversation with respect to the reduction in the price of the raw material, and the consequent reduction that should take place in the price of gas, the Chairman assured the deputation that the company would be most happy to reduce the price as soon as circumstances would permit.

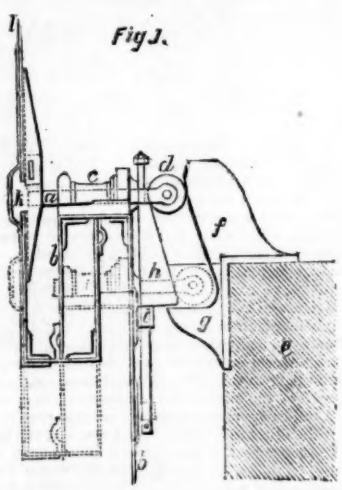
Mr. Johnson, of the Victoria Theatre: I hope, sir, you will send me, at as early a period as possible, a notice of the reduction. (Laughter.)

Dr. Challice, on behalf of the deputation, having thanked the board for the courteous reception accorded to the Gas Protection Society, the deputation withdrew, and proceeded, by appointment, to Southampton Street, for the purpose of having an interview with the directors of the London Company, on the same subject.

The Chairman of this company having objected to the presence of reporters, those gentlemen withdrew. The deputation then retired, for the purpose of considering whether, as a public body, and representing a great public principle, they would confer in private. After some consultation, they decided on meeting the directors within closed doors; and our reporter was informed, that the conversation that ensued was similar to that which occurred at the conference with the Phœnix Company.

PIGGOTT'S TELESCOPIC GASHOLDER.

The improvement consists in fixing, or locking together, the several sliding parts of the gasholder as each part is raised from the tank, and detaching, or unlocking, the several parts as they descend and slide into each other, the same being effected by self-acting mechanism brought into action by the motion of the gasholder. The advantages of this will be acknowledged by all who have the care of telescopic gasholders; for, notwithstanding every precaution, the two parts of the gasholder are liable to be separated from each other whilst both are in action, and serious accidents have occurred in consequence. The objection sometimes made to the use of a telescopic gasholder, on account of the extra pressure given by the lower part, in addition to that given by the upper part only, is entirely obviated by this improvement. This inequality may be reduced by counterpoise; but the pressure cannot be assimilated, nor nearly so, on account of friction, without great danger of the lower part of the gasholder being overbalanced, and so allowing the upper one to descend into the tank first instead of last. Both the inconvenience of variable pressure, and also the danger arising from the several parts of the gasholder unduly separating from each other, are entirely removed by this patented improvement, which is effected by the use or application of locks or fastenings placed round and fixed to the gasholder, in numbers corresponding to its diameter. These fastenings may be constructed in various ways, and will be understood by the following drawings and descriptions:—



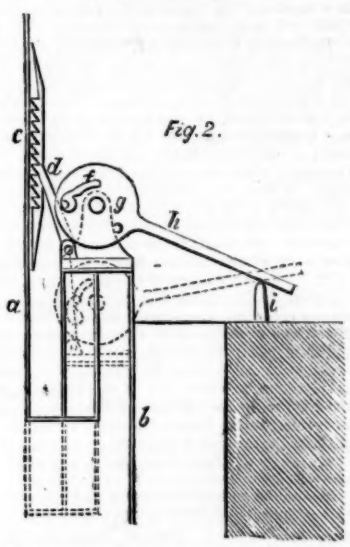


Fig. 1. *e* is a bolt placed on the top of the outer sliding portion *b* of the gasholder, the said bolt sliding horizontally in the case *e*, fixed to the outer part of the gasholder *b*. The said bolt has motion in the direction of a radius of the gasholder. The outer end of the bolt *a* carries an anti-friction roller *d*; *e* is the edge of the tank in which the gasholder sinks. On the said edge *e* is fixed the vertical inclined plane *f*; to the lower part of the incline *f* is affixed a stop or projecting *g*: *h* is a wedge, the lower end of which slides in the guide *i*, and the upper end passes through a slot in the bolt *a*. When the several parts are in the positions represented in the drawing, the inner end of the bolt *a* enters a staple or recess *k* in the inner sliding part *l* of the gasholder, and fixes the said inner part *l* and outer part *b* of the gasholder together, and the said parts remain locked or bolted together until the lower edge of the part *b* of the gasholder has approached to within a short distance of the bottom of the tank. When by the descent of the gasholder the bolt *a* has arrived at the level represented in dotted lines, the said bolt *a* will have been withdrawn from the staple *k*; for the wedge *h* being prevented from descending by the stop *g*, the inclined stationary edge of the said wedge, acting against the roller of the descending bolt, causes the said bolt to move horizontally from the position represented to that indicated in dotted lines. The inner part *l* being now completely detached from the outward part *b*, the said part *l* may descend freely in the said part *b*. When the inner part *l* rises from the postion indicated in dotted lines, it carries up the outer part *b*, and the roller of the bolt (in the position indicated by dotted lines) coming against the incline *f* is forced inwards; and when the gasholder has risen to the position represented, the bolt *a* has become engaged in the staple or recess *k*. The wedge *h* remains stationary during the rising of the bolt *a* from the position indicated in dotted lines to that represented in continuous lines. Fig. 2. *a* is the inner and *b* the outer parts of the gasholder; *c* is a rack on the part *a*; *d* is a pall or click on the part *b*. As the part *a* ascends, the rack *c* escapes under the pall or click *d*. When the part *a* has risen so high as to commence lifting the part *b*, the two parts, *a*, *b*, are fixed or locked together: *e* is a pin connected with the pall or click *d* which said pin engages in the slot *f* in the disc *g*. When the gasholder has descended until the disc *g* assumes the position indicated in dotted lines, the arm *h* having been arrested by the fixed stop *i*, a partial rotation has been effected in the disc *g*, and the pall or click *d* has been withdrawn from the rack *c*, as will be understood by reference to the parts in dotted lines. The part *c* being now disengaged from the part *b*, can readily slide therein.

THE WATER-LEVEL OF GAS-METERS.

Royal Dublin Society, Feb. 29.

At a Meeting of the Society for the discussion of subjects connected with Science and the Arts, held on the 29th ult., at the Society's House, Kildare Street—Dr. Corrigan in the chair—Mr. Gilbert Sanders read the following paper on an improved method of maintaining the just water-level in gas-meters and steam-boilers:—

"The subject which I have the honour of bringing before this society this evening, and which is now for the first time made public, is an improvement in an apparatus used for measuring gas, and for which a patent has just been obtained. I think I shall be more successful in showing the value of the improvement, and at the same time meet the wishes of several of our members, if I, in the first instance, explain to this meating the construction of the gas-meter, and the principles on which the measurement and registration are effected; premising, however, that my present communication has reference only to the gas-meter most generally in use, commonly known as the wet meter. However, before I proceed with the description of the meter, I will beg leave to say a few words in reference to the doubts which some entertain as to the reliance to be placed on its registration of the gas consumed. These doubts, I imagine, chiefly arise from the circumstance of the meter itself being concealed within a case,

and its operations so mysteriously carried on, that very few indeed can comprehend how it is possible the gas can be really measured; nor can we wonder that the public have so little knowledge of the instrument which is the chief—I may almost say the only—medium of account between the gas-sellers and the gas-buyers, to the extent of millions of money annually; for the use of the gas-meter has extended, with British civilization, to all parts of the globe. Can we wonder, then, the public have so little knowledge of the mechanism of this machine, when we find a vast many of those who are engaged in the management of gas apparatus perfectly incapable of understanding it themselves; not because of its complicity, but because they will not take the trouble to inform themselves properly of its principles? Many people imagine the meter is a sort of clock, which is wound up occasionally by the inspector. Others think the inspector can set it to what figure he pleases. I trust I shall be able this evening to convince my audience of the absurdity of such notions, and that before we part you will be satisfied that the gas-meter is a *bonâ fide* measure; and that whatever errors there may be occasionally in its indications, the implement which is the special subject of this evening's discourse will effectually rectify, and make the gas-meter one of the most perfect measures of quantity we know of for commercial purposes. It is very right that gas companies should take every possible opportunity of making their customers acquainted with the structure of the instrument which keeps the account against them, and secure their confidence in it. They should be taught to read the index, and be able to observe for themselves how the account goes on; for it must be remembered that gas, as well as candles and every other article of domestic consumption, requires the watchful eye of economy to restrict its use to the means of the consumer or the requirements of the household. Of late, the outcry in some towns against the gas-meter has assumed a somewhat serious form, and public bodies have investigated the meter question and the charges made against the companies; and, although these judges in the matters commenced the investigations with prejudiced feelings, they have invariably come to conclusions favourable to the meter and the meter system. In London, public officers have been appointed to test the meters of the several companies supplying gas within the district allotted to each. The testing of meters is comparatively a slow process. However, I have no doubt it is beneficial, in so far as it gives gas consumers some protection, or if he fancies it does, the end is answered. I cannot conceive it possible that any respectable company would knowingly issue false measures. The board of directors that would do so would be quite at the mercy of their servants, whom they dared neither reprimand nor discharge for fear of exposure. However beneficial the original testing may be, and I will not deny the utility of, it would be out of the power of any staff of testing officers we could contemplate, to keep the meters adjusted whilst at the consumers' houses. We see that the number of meters tested by Mr. Mills, the inspector of meters for the South London district, in three months, was 1438. I have no means of knowing how many meters there were actually at work in his district at the time—perhaps more than 100,000. If we can construct a gas-meter which, once tested and sealed as correct, will continue so under all the ordinary circumstances of use, we shall accomplish more for the protection of the gas-consumer than any system of supervision we can devise. It is my opinion that we have now obtained that desideratum, and that any of the ordinary wet gas-meters at present in use may, with the addition of the patent compensator, be made to register correctly after having been once adjusted. The weights and measures used in our every-day transactions of trade are rarely absolutely correct, even when weighing or measuring the most valuable commodities. These weights and measures are under the surveillance of corporations, and other public authorities; yet, notwithstanding all the vigilance of these functionaries, weights and measures deficient in quantity are made use of by persons whose sense of justice is not over nice. If we could construct such articles so that they would neither weigh nor measure unless they were just, it would be out of the power of such people to defraud their customers; but what appears to be impossible to effect for the ordinary weights and measures of commerce, we have succeeded in accomplishing for the gas-meter. There is now upon this table a common gas-meter. I will show you, by attaching to it the patent compensator, the supply of gas will be cut off. So long as the meter shall be in a condition to register incorrectly, either for or against the consumer, it contains within itself a means for constantly adjusting the meter whenever there is a tendency to err; and, finally, when the adjusting power is exhausted, it can be instantly restored by the addition or withdrawal, as the case may require, of a small quantity of water. The most concise description I can give of the gas-meter is, that it is a hollow cylinder, suspended on an axis, and divided into four compartments or chambers; it is immersed in water to a certain depth, and is so contrived that, as the gas flows through it, each chamber in its turn is filled with gas, at the same time causing the cylinder to rotate. Every chamber must be perfectly filled and perfectly emptied of its gas once in every revolution of the cylinder. If the cubic contents of those four divisions are known, the actual quantity of gas which passed through the cylinder in its revolution is also known; and if the whole cubical quantity be a fraction of a cubic foot, the revolutions will be recorded on the dials in front of the meter, reduced by wheel-work to hundreds, thousands, tens of thousands of cubic feet. If the cylinder be correctly made and correctly adjusted for the water-line, its registration will most certainly be correct, so long as its water-line is just; but any alteration of the line will alter the correctness of the meter. One of the objects to be attained by the improvement is to keep the water-line in its true position. In the elementary description I have just given of the meter, I omitted to mention some other portions of apparatus contained in the complete instrument; but I will refer to these when describing the meter in detail. Although I have, in so few words, given an outline of the construction of the meter, or rather the measuring portion of it, it would be impossible to make you comprehend the manner in which all this is effected, without availing myself of the free use of the models I have prepared for the purpose. [Mr. Sanders then proceeded to illustrate his paper by means of some nicely-constructed models.] Having, I trust, described with sufficient clearness the construction of the gas-meter, and shown you that the correctness of its registration depends on the water-line being maintained at its just level; and having made you fully acquainted with the only errors of which the meter is susceptible—errors against the company for the most part—I will briefly allude to one of the many frauds ingenious but dishonest customers practice against the company, with a view of showing how the compensator will effectually stop that particular system of thievery. The English gas companies, finding it difficult to get the magistrates to convict delinquents under the penalty-provisions of the gas acts, have recourse now to the criminal courts, and prosecute for stealing gas. Several gas-stealers have been severely punished. Not long since the mayor of a borough town was sentenced to twelve months' imprisonment in the gaol of his own town for stealing gas from the local company. I wish I could say these frauds were not known out of England and Scotland; but I regret that I cannot say so. The honest gas-consumer must be interested in the suppression of these practices, inasmuch as they tend to diminish the profits of the gas company, and thereby, to a certain extent, prevent the reduction which better profits would ensure. The improvement for which Mr. Donovan and myself have obtained our patent is a compensator placed either within the case of the meter or in a separate vessel. It is a hollow or solid body, supported on an axis at or near the true water-line, and it is so loaded or balanced, that if any further quantity of water be poured into the meter, the compensator will rise out of the water exactly in proportion to the quantity so added, bulk for bulk, thereby leaving a space for the extra water, without in the smallest perceptible degree raising the water-line, which would not be the case if there were no compensator. If a quart of water be poured into a five-light meter (which has no compensator) after the true water-line has been reached, the capacity of the meter for gas is diminished, and probably the meter might register 10 per cent. too much; but where the same quantity of water is added to the compensated meter, no alteration of the justness of the measurement occurs. However, the meters supplied by our company are so regulated that you could not add half that quantity beyond the just proportion without shutting off the gas from the burners. Let us now take an ordinary meter and adjust the water-line; we may remove at least a quart of the water before the meter ceases to work, and then we reverse the loss which now falls on the company. Again the compensator acts—it decends as the water is removed, bulk for bulk, still maintaining the water in its just level. These changes, though, are limited to the size of the compensator; but we are not limited in that respect, for we may make it large enough to compensate for the loss of a gallon, or even for a hogshead, of water; but of course its size would always be regulated by the requirements of the meter, &c. The question naturally will arise—How will you provide for the compensation when the addition or loss shall exceed the volume of your compensator? Will not the meter then err? We reply—No; for we have so contrived our apparatus that, when the power of the compensator is expended in either direction, the supply of gas will be withdrawn either wholly or in part, and an addition or abstraction of a small quantity of water will restore the meter to its working condition again. It is computed by us that a compensator, of the dimensions of that which is applied to this meter, will keep it quite correct for six or twelve months; and as the company's inspector must see the meter quarterly, there is very little danger of the lights being shut off from want of attention. I have stated that a separate vessel for the compensation may be employed; we must, however, connect it to the meter by two tubes; one to transfer the water from one vessel to the other when necessary; the other is for the gas; and the meter and compensator may be so much apart, that one may be in one room and the other in another. Thus, you see, the meter is now several feet from the compensator; and yet so delicate is the action of the latter, that a wine-glass of water poured into the meter will raise the compensator a corresponding volume, though it is several feet off; and the only means of communicating the influence, this small tube. Whether the compensator be in the meter or in its separate case, it is alike beyond the control of the gas company or its officers, and the gas consumer or his servants: it can be tampered with by neither party. This fact, supported by the experiments of this evening, will, I hope, assure the society that such a thing as an honest gas-meter does exist. In conclusion, I wish to observe that the gas-meters now in general use are really true and honest instruments when at their proper adjustment. We have not attempted more in our improvement than to preserve that adjustment constant; and, notwithstanding all that has been said against the wet gas-meter, and all the prejudice that exists in reference to it and gas-meters generally, I assert my belief that there is no more fairly-constructed measure than it in commercial use. Whatever errors it is liable to are not of construction, but of circumstance; and against even these we have now a sufficient remedy.

The Chairman said, an opportunity had been afforded Mr. Sanders of explaining, in a most lucid and gratifying manner, the construction of one of the most important instruments that occurred to them in social life.

Mr. James Haughton wished to know why the public were allowed to have so important an instrument as the water-level in their own hands.

Mr. Sanders said the principle of common justice required he should have the power of preventing the gas company from defrauding him.

Crystal Palace District Gas Company.—The annual general meeting of this company took place, in accordance with the deed of settlement, on Tuesday, the 4th inst.—Mr. James Erasmus Wilson in the chair. The meeting was well attended, and, as stated in the notice by which it was called, was for the purpose of declaring a dividend, the election of directors, and other business. The directors proposed an adjournment until the 27th inst., for the purpose of completing the balance-sheet and report, which were not ready to submit to the shareholders. This was objected to, and a resolution was carried unanimously that a committee of the shareholders should be appointed to investigate and report upon the cause of delay in the preparation of the accounts, and to inquire into and report upon the state of the company's affairs. Several of the shareholders expressed their fullest confidence in the capabilities of the undertaking (which occupies one of the most rapidly increasing and beautiful suburbs of London), if its affairs were managed with prudence. The meeting stands adjourned until the committee of investigation are ready with their report.

THE COAL TRADE OF THE NORTH.

The importation of sea-borne coals into London in February, all (with the exception of 11,000 tons) from the north of England, was 245,402 tons. The increase in the importation of this kind into London during January and February, over the same period of 1855, was 150,399 tons; and by the competitors with sailing-vessels and railways, was 103,241 tons.

Shipowners, who have profited so largely by the war, are also suffering a temporary reverse, for freights of every description in the trade are much depressed. Freights to London, which during the latter part of last year were from 9s. 6d. to 10s. per ton, are now quoted in Newcastle Quay at from 6s. 6d. to 7s. Hamburg freights in September were £13 per keel, but now are £9. 18s. to £10. Coal freights to Constantinople are £36, and to the Crimea £46 per keel. This is rather a severe collapse from war prices; but, as the coal trade was extremely prosperous previous to the war, it may be fairly judged that when the ports, now closed, are opened, and trade flows into its natural channels again, a favourable reaction will take place. By an arrangement made between the shipowners and the men, sailors' wages on the London voyage have dropped from £6 to £5 a month.

It is not known whether the coal-miners will resist any attempt to reduce their wages. They have a protective union, and probably they may insist upon the pits working short time, to limit the supply; but the coal-owners will not consent, as they are subject to severe competition in the London market. The railways have brought into the metropolis, in February alone, no less a quantity than 112,405 tons from the Derbyshire, Yorkshire, and Staffordshire coal-fields.

Any long-continued stagnation of the coal trade would be severely felt in this district, as it is an interest that during the past ten or fifteen years has grown into immense magnitude. In the counties of Durham and Northumberland there are 15,500 hewers engaged in pits underground; 3300 safety-staff men; 1400 boys; 1200 off-hand men; 7600 putters, &c.; and 7642 men employed above ground. In addition to those workmen, the colliers require 18,000 offshoot men at the wagon-ways, staiths, &c. The annual production of coal in those two counties is 15,500,000 tons, which, at 6s. 6d. per ton at the pit mouth, is of the value of £5,037,500. The total annual production of coal in the United Kingdom is 64,739,789 tons, about the annual value of £20,000,000 sterling.

Advertisements.

KIMBERLEY'S
PATENT GAS APPARATUSES

consist of Eighty-nine patterns, sizes, and varieties of GAS HEATING STOVES, Twenty kinds of Gas Cooking Ranges, Counter, Greenhouse, Bed-room, Office, Shop, Warehouse, Church, and Hall Stoves; Lacquering, Boiling, Steaming, Stewing, Ironing, and Griding Stoves; Ovens, Baths, Liquor, Shop, and Ornamental Stoves; the whole either Black, Galvanised, or Enamelled. A new Book, just published, with 43 pages of interesting matter to all concerned in Gas, sent on application—postage one penny. The Stock includes upwards of ONE HUNDRED AND TWENTY kinds, prices, patterns, and sizes, and is the most extensive variety and stock ever attempted before. Their success continues great, as the numerous references prove.

56, & 57, INGE STREET, BIRMINGHAM.

*** Gas-Fitter and Gas-Fitting Manufacturer in every branch of the Trade, and to any extent.

MR. WILLIAM RICHARDSON,
CONSULTING ENGINEER,
DUDLEY.

MR. HENRY GORE,
CIVIL AND CONSULTING GAS ENGINEER.
OFFICE,
25, YORK PLACE, LEEDS.

HARRIS AND PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King.
Originally J. Pidcock, Esq.

JAMES PINCHBECK,
GAS METER MANUFACTURER,
26, CAMDEN-STREET, and 9, PIERREPOINT-ROW,
ISLINGTON, LONDON.
Begs respectfully to announce to Gas Companies and Fitters, that from upwards of 20 years' practical experience, he is enabled to supply a METER combining correctness, durability, and economy.
N.B.—Repairs on the lowest scale.

JAMES OAKES and CO.,
ALFRETON IRON WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, CITY ROAD,
LONDON,
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, &c.; also Lamp Columns of different patterns.
London Agent, Mr. ALFRED PENNY, Engineer, WENLOCK IRON WORKS, Wharf-road, CITY-ROAD, who undertakes the manufacture and erection of gas-holders, purifiers, iron roofs, and every description of apparatus in use in gas works.

H. JONES, Gas Meter Manufacturer,
No. 44, OLD-STREET, St. Luke's, London, begs respectfully to call the attention of Gas Companies yto his latest improvements in the WET METER, b means of which water cannot be abstracted, neither can Gas by any possibility pass through the Meter without registering.

BY ROYAL LETTERS PATENT,
" DATED OCT. 19, 1855."
15,000 CUBIC FEET OF GAS FROM ONE TON OF COAL.
USE BASFORD'S PATENT FOR GENERATING PURE GAS.
TERMS OF LICENSE, &c., may be obtained of the Patentee, or of MESSRS. MILL AND STRUTTON, 17, AMPTON PLACE, GRAY'S INN ROAD, LONDON.

By Her Majesty's Royal Letters Patent.

JOSEPH BOULTON,
PATENT DRY GAS-METER MANUFACTURER, and also Maker of his Improved WATER METERS.
No. 28, BAGNIGGE-WELLS-ROAD, CLERKENWELL, adjoining the Police Office.—Late of No. 1, Coppice-row, LONDON.
Experimental and Station Meters of any size made to order on the shortest notice.—Governors, Pressure Registers, Gas-cooking Stoves, and every description of Gas Apparatus.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connections, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Boringa.
PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas Works, in stock, on wholesale prices, at
LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground-street, LONDON.

WILLIAM RICHARDSON & CO.,
ENGINEERS, IRONFOUNDERS,
AND
CONTRACTORS
for the Erection, Enlargement, and Repair of
GAS & WATER WORKS,
No. 84, CHARLES-STREET, CITY-ROAD,
LONDON.
WORKS:
Tunnel Foundry and Iron Works, DUDLEY.

M. SHEEN, Gas and Railway Lantern Maker, 90½, Holborn Hill, begs to inform Managers of Gas-Works, &c., that she continues to contract and supply Lanterns on reasonable terms, and keep them in repair by the year.

TO GAS COMPANIES, FITTERS, AND IRONMONGERS.
LLOYD and SUMMERFIELD, Manufacturers of CUT and FLINT GLASS Jet Moons, Globes, Hemispheres, and Chimneys of every description; Hall Lamps, Lustres, and Chandeliers of the most modern patterns.
PARK GLASS WORKS, BIRMINGHAM.

PATENT GAS METER MANUFACTORY,
No. 66, Snow-hill, London.
WILLIAM SMITH, by the improvements he has made in the Wet Meter, and which he has secured by her Majesty's Royal Letters Patent, the accuracy of their registry is rendered certain by the introduction of the adjusting slide and hydraulic, whereby a Perfect Water Level is readily obtained, and the Hydraulic precludes the possibility of abstracting water from the meter by increased pressure or otherwise, thus surmounting the great desideratum of the Wet Meter. In his Patent Equitable Gas Meter neatness and strength are combined, the backs and fronts of the case being stamped by powerful machinery out of thick plate iron (tinned or galvanized); and the internal construction is of the best metal, which will resist the action of any impurity in the gas.
Old Meters may readily have the adjusting slide and hydraulic applied, thereby having accurate measurement assured.
Station Meters, Governors, &c., made on the shortest notice.

GAS LIGHTING.
MR. T. A. HEDLEY (A.I.C.E.), CONSULTING GAS ENGINEER, may be consulted upon all matters connected with the manufacture and distribution of gas. Plans, specification, and drawings supplied.—Offices, Warkworth, BANBURY.

EIGHTON MOOR GAS COALS.—Parties wishing to be supplied with these first-class Gas Coals will please to apply to Mr. MATTHEW NESBIT, EIGHTON MOOR OFFICE, NEWCASTLE-UPON-TYNE. These coals are well known as among the richest in gas, and working the roundest on the River Tyne. They are extensively used by metropolitan gas works.

ANDERSON'S
DOUBLE-ACTING PISTON EXHAUSTER
is the most simple and effective machine of the kind made. It gives no appreciable oscillation or slip; works with extremely little friction; and requires no internal lubrication.
These Exhausters are in operation both in London and the Provinces, pumping from 10,000 to 70,000 cubic feet of gas per hour. They occupy very little space, and may be set either perpendicular or horizontal.
Particulars of price, &c., may be had on application to Mr. ANDERSON, at the Gas Works, Rotherhithe LONDON.

TO GAS COMPANIES, ENGINEERS, AND MERCHANTS.
EDWIN DIXON,
WROUGHT-IRON TUBE WORKS,
WOLVERHAMPTON,
begs with the utmost confidence to solicit the order of Gas Companies, and persons using or selling Gas Tubes. Having for a long period supplied the largest Gas Companies and Consumers in the United Kingdom and the Continent with unvarying approbation, and almost exclusively the Local Boards of Health under Government Engineers, with Galvanised Iron Tubes and Connections, it has become an inducement to make such facts known.
Large Stock always being on hand, orders of any magnitude, from 10 to 100,000 feet, are executed promptly, and carefully tested by powerful hydraulic pressure before leaving the Works.
Boiler Tubes, Core Bars, Hollow Spindles, and Hydraulic Press Pipes, to resist 5000 lb. to the square inch, made on the shortest notice.
The only Prize Medal of the Great Exhibition, 1851, awarded.

NOTICE.—Mr. N. DEFRIES, Consult- ING GAS ENGINEER, begs to inform gas companies and the public, that he is desirous of meeting any gentlemen at his WORKS, NEW ROAD, ST. PANCRAS, where, under his own superintendence of the manufacturing department, they will have the fullest opportunity of investigating the many improvements he has recently effected in his ROTARY-VALVE DRY GAS-METER, by which full security will be afforded against leakage and non-registration, even against the searching effects of Cannel Coal Gas. The Rotary-Valve Meter is warranted to register inflexibly correct at a working pressure of half a tenth, and less than a quarter of a foot per hour upon a blue light; and a guarantee will be given to all gas companies to keep it in repair for not less than five years free of expense. With this meter the gas-supplier may fully depend upon a fair return, and the public upon having a just measurer.
GAS BATHS, GAS COOKING and HEATING STOVES, for all classes. The British Polytechnic Gas-fire, &c. Conservatories and Buildings heated by gas, and perfect ventilation secured.
Any gentleman desirous of consulting Mr. Defries in especial cases, may meet him either at his office, 145, REGENT STREET, or at his residence, 5, FITZROY SQUARE, by giving one day's notice.
Gas-works erected for private houses on the most improved principles, or on a large or small scale.

Share List.

(Directors and Managers of Gas Works are earnestly requested to enable us to rectify the errors and fill up any omissions in the following List.)

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£	**ENGLAND.**	£ s. d	£ s. d	£ s. d
		Aberdare			
		Abergele			
		Aberystwith			
		Abingdon			
1050	10	*Acerington*	10 0 0	7 0 0	15 10 0
		Albrighton			
		Alcester			
		Alford			
		Alfreton			
		Alnwick			
		Alston Moor			
250	10	Alton	10 0 0	5 0 0	10 0 0
800	5	Altrincham	5 0 0	6 0 0	6 0 0
		Amersham			
170	10	Ampthill	10 0 0	5 0 0	10 0 0
350	10	Andover	10 0 0	5 0 0	11 0 0
330	5	Appleby	5 0 0	3 0 0	2¼ to 2½
		Arundel			
		Ashbourn, Derby			
292	5	Ashburton	5 0 0	5 0 0	
		Ashby-de-la-Zouch			
		Ashford, Kent			
1600	30	*Ashton-under-Lyne*	30 0 0	10 0 0	60 0 0
		Atherstone			
		Axminster			
200	20	Aylesbury	20 0 0	5 0 0	21 0 0
		Aylsham, Norfolk			
		Bacup, Lancashire			
		Bakewell			
200	10	Baldock	10 0 0	5 0 0	10 0 0
1000	10	Banbury	10 0 0	5 0 0	10 10 0
		Bangor			
500	5	Barking, Essex	5 0 0	5 0 0	5 5 0
260	10	Barnard Castle	10 0 0	5 10 0	10 15 0
		Barnsley £6000		7 10 0	
100	20	Barnstaple	20 0 0	5 0 0	23 0 0
1158	2	Barton-on-Humber	2 0 0	5 0 0	2 0 0
120	25	Basingstoke	25 0 0	7 0 0	35 0 0
2500	20	*Bath*	16 0 0	10 0 0	30 to 32
		Battle £2000		6 0 0	
56	26½	Bawtry	26 10 0	5 0 0	25 0 0
		Beccles (& Water)			
300	30	Bedford	25 0 0	4 0 0	20 0 0
200	10	Bedworth	10 0 0	5 0 0	11 0 0
		Belford			
		Bedale, Yorkshire			
		Belper			
		Beminster			
420	5	Berkhempstead	5 0 0	6 0 0	6 0 0
700	10	Berwick-on-Tweed	10 0 0	6 0 0	12 0 0
		Bewdley			
280	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
170	10	Bicester	10 0 0	6 0 0	11 5 0
		Bilston £15,100	5 0 0	7 0 0	6 10 0
		Billericay			
		Bingham			
		Bingley £7400		4 0 0	
		Birkenhead £70,000	35 0 0	3 0 0	35 to 37
2400	50	*Birm. & Staffordsh.*	50 0 0	10 0 0	95 to 96
2400	25	*Ditto*, new shares	10 0 0	10 0 0	15 to 16
928	75	*Birmingham*	75 0 0	10 0 0	156 to 158
		do. 1-10 shares			15 to 16
		Bishop's Auckland			
230	10	Bishop's Stortford	10 0 0	5 0 0	10 0 0
3000	15	*Blackburn*	15 0 0	10 0 0	25 0 0
		Blandford			
		Blyth			
		Bodmin			
		Bognor			
3909	16½	*Bolton*	16 10 0	9 19 8	35 0 0
7466	16	„ new	1 0 0		
		Boroughbridge			
160	50	*Boston*	50 0 0	10 0 0	75 0 0
200	10	Bourn	10 0 0	5 0 0	10 0 0
160	10	Brackley	10 0 0		
		Bradford, Wilts.			
	25	„ *Yorks.* £45,000	25 0 0	10 0 0	49 0 0
		Bramptn, Cumblnd			
		Brandon, Suffolk			
		Brecon			
		Bridge-end, Glam.			
6000	5	*Brierly Hill*	5 0 0	4 0 0	5 2 6
		Brighouse			
2250	20	*Brighton*	20 0 0	5 0 0	15 to 16
1125	20	„ new shares	16 0 0	5 0 0	10 to 12
2471	20	*Brighton and Hove*	20 0 0	3 10 0	
107	8	„ new shares			
179800	Stk.	*Bristol United*	Stock	8 0 0	170 to 175
154	8	Brixham	8 0 0	5 0 0	5 to 6
		Braintree			
750	50	*Brentford*	50 0 0	5 10 0	48 to 50
800	25	„ new shares	11 0 0	5 10 0	11 0 0
		Brentwood			
200	30	*Bridgwater*	30 0 0	5 0 0	30 0 0
400	10	Bridlington	10 0 0	7 10 0	10 0 0
		Bridport			
		Brigg			
		Broadstairs			
		Bromsgrove			
		Bromley (Kent)			
		Broughton			
120	10	Bruton	10 0 0	4 0 0	8 0 0
		Brynmawr			
100	25	Buckingham	25 0 0	6 0 0	28 0 0
600	12	*Burnley*	12 0 0	10 0 0	
		Burslem&Tunstall			
		Burton-on-Trent			
		Bury, Lanc. £6570			
		Bury St. Edmund's		5 0 0	
200	10	Buxton	10 0 0		
		Callington			
		Calne, Wilts			
		Camborne			
	50	*Cambridge* £34,500	50 0 0	7 0 0	76 0 0
240	50	*Canterbury*	50 0 0	6 0 0	61 to 63
240	25	„ 2nd iss.	25 0 0	6 0 0	30 to 31
	240	*Canterbury*, 3d iss.	12 15 0		
	24	„ 4th iss.	6 5 0		
	800	*Cardiff*	25 0 0	7 10 0	34 0 0
		Carmarthen			
		Carshalton			
		Castle Cary			
249	5	Castleford	5 0 0	5 0 0	5 0 0
300	5	Castletown (Man)	2 0 0		
		Chapel on the Frith			
		Chard			
		Chatteris			
235	10	Cheadle	10 0 0	5 0 0	10 0 0
100	25	Chelmsford	25 0 0	5 0 0	40 0 0
100	25	„	15 0 0	5 0 0	15 0 0
		Cheltenham £18,732		9 0 0	
		Chepstow			
230	10	Chesham, Bucks	10 0 0	5 0 0	10 0 0
		Chester			
250	5	Chester-le-Street	5 0 0	6 0 0	5 0 0
		Chesterfield £13,123		4 17 6	
240	25	Chichester	25 0 0	6 0 0	30 0 0
		Chippenham			
		Chipping Norton			
100	10	Chipping Ongar	10 0 0	2 10 0	5 0 0
		Chorley			
		Chowbent (Lanc.)			
		Christchurch			
		Cirencester			
		Clare (Suffolk)			
		Cleckheaton, York.			
		Clitheroe			
750	4	Cockermouth	4 0 0	7 0 0	5 0 0
		Colchester			
		Collumpton			
		Colne, Lancashire			
		Coleford, Gloucest.			
300	5	Coggeshall	5 0 0	3 0 0	3 0 0
200	25	*Congleton*	25 0 0	5 0 0	31 0 0
		Conway			
		Cowbridge			
		Corsham			
800	25	*Coventry*	25 0 0	6 0 0	30 0 0
		Cowes			
300	5	Crowland			
		Crowle (Lincoln.)			
		Croydon £20,000		5 0 0	
		Cranbrook £1900		5 0 0	
		Crayford & Bexley			
420	5	Crediton	5 0 0	5 0 0	6 0 0
		Crewe, Cheshire			
		Dalton			
		Darlaston			
		Darlington&Water			
250	20	Dartford	20 0 0	7 10 0	27 0 0
125	20	Daventry	20 0 0	6 0 0	24 8 0
		Dawley, Salop			
346	5	Dawlish	5 0 0	8 0 0	7 10 0
		Deal			
1200	1	Deddington	1 0 0		
		Delph (Yorkshire)			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
820	10	*Deptford*	10 0 0		1 to 2
	25	*Derby*	25 0 0	10 0 0	50 0 0
90	20	Dereham (East)	20 0 0	5 0 0	21 0 0
4000	5	*Dewsbury*	5 0 0	7 0 0	8 12 6
		Devizes			
7000	5	*Devonport*	5 0 0	6 0 0	7 10 0
		Dolgelly			
280	25	Dorchester	25 0 0	5 0 0	30 0 0
120	25	Dorking	24 0 0	5 0 0	25 0 0
192	25	Douglas, Isle of	25 0 0	8 0 0	30 0 0
209	56¼	*Dover* [Man	56 10 0	5 15 0	71 to 72
25	60	Downham	60 0 0	7 10 0	
		Driffield			
		Droitwich			
600	20	*Dudley*	20 0 0	5 0 0	28 to 30
		Droylsden			
		Dukinfield			
		Dunmow			
250	10	Dunstable	10 0 0	5 0 0	8 0 0
		Durham			
276	9	Dursley, Gloster	9 0 0	5 10 0	8 0 0
300	10	Eastbourne			
		East Grinstead			
		Egremont, Cumbld			
703	6½	Elland	6 10 0	8 0 0	10 0 0
		Ellesmere			
200	10	Emsworth			
400	5	Enfield	5 0 0	5 0 0	5 0 0
300	19	Epsom and Ewell	19 0 0		
		Eton (Cannel Gas)			
		Evesham			
1600	25	*Exeter*	25 0 0	8 0 0	40 to 42
		Exmouth			
		Eye, Suffolk			
150	10	Fairford	10 0 0		
64	25	Fakenham	25 0 0	5 0 0	25 0 0
		Falmouth			
100	30	Fareham	30 0 0	2 10 0	30 0 0
120	25	Farnham	25 0 0	10 0 0	42 0 0
		Farringdon			
		Faversham			
		Ferry Hill (Durhm.)			
	5	Filey	5 0 0	5 0 0	5 0 0
		Fleetwood			
300	10	Folkestone	10 0 0	10 0 0	15 0 0
240	10	„ new shares	8 0 0	10 0 0	13 0 0
		Fowey			
		Fordingbridge			
240	5	Framlingham	5 0 0	5 0 0	5 10 0
		Frome			
		Gillingham, Dorset			
		Glastonbury			
		Glossop £10,000		9 0 0	
1000	25	*Gloucester*	25 0 0	7 10 0	28 0 0
516	5	Gomersal	5 0 0		
		Godalming			
	350	£10	Gorleston & South-Gosport [down	£ s. d 2 10 0	£ s. d 2 10 0
	450	20	Grantham	20 0 0	7 0 0	28 0 0
	1000	20	Gravesend	20 0 0	5 0 0	21 0 0
			Grays Thurrock			
	1000	10	*Great Grimsby*	9 10 0	8 0 0	13 to 14
			Great Torrington			
		25	Guildford	25 0 0	4 0 0	20 0 0
			Guisborough			
			Hadleigh			
			Hailsham			
			Hales Owen			
	360	5	Halesworth	5 0 0	7 10 0	5 10 0
	600	25	*Halifax*	25 0 0	10 0 0	48 0 0
			Halstead			
			Hampton Court			
	1000	10	*Harrogate*	6 5 0	5 0 0	6 5 0
		5	*Hartlepool* £15,137	5 0 0	7 10 0	7 12 6
			Harwich			
	540	6	Haslingden, Lanch	6 0 0	7 10 0	6 0 0
	330	50	*Hastings and St. L.*	50 0 0	7 0 0	60 0 0
	500	5	Havant			
			Haverhill			
			Haworth, Yorks			
			Hay (Brecon)			
			Hayle			
	4965	1	Hebden Bridge	12 6		15 0
			Helstone			
	250	10	Hemel Hempstead	10 0 0	4 0 0	6 10 0
	300	10	Henley-on-Thame	10 0 0		
			Hereford £5300		4 0 0	
	300	10	Herne Bay	10 0 0	6 0 0	11 0 0
	270	10	Hexham	10 0 0	7 0 0	12 0 0
	400	25	*Heywood*		7 10 0	
			Higham Ferrers			
	520	5	High Wycombe	5 0 0	6 0 0	6 16 0
			Highworth (Wilts)			
	280	10	Hinckley	10 0 0	5 0 0	9 0 0
			Hindley, Lancash.			
	200	20	Hitchen	20 0 0	5 0 0	20 0 0
	100	10	Hythe & Sandgate	10 0 0	6 0 0	11 0 0
			Huddesden			
			Holbeach			
			Holmfirth £8880		3 10 0	
			Holyhead			
			Holywell (see Brit.			
	95	25	Honiton [Prov.	25 0 0	4 0 0	17 0 0
			Horbury			
	6	500	Horncastle	500		
	1200	24	Horsforth	2 10 0		2 10 0
	128	20	Horsham	20 0 0	5 0 0	
		10	Houghton-le-Sprg.	10 0 0	8 0 0	
			Howden [B.Prov.)			
			Hull, Sculcoats (see		5 0 0	
			Hull, £11,712. 10s.			
	210	10	Hungerford	10 0 0	5 0 0	10 0 0
			Huddersfield			
			Hyde (Cheshire)			
			Idle and Eccleshill			
	400	6¼	Ilkeston	6 5 0	3 10 0	6 5 0
			Ilminster			
			Ilford			
			Ilracombe			
			Ironbridge			
	2800	10	*Ipswich*	10 0 0	7 0 0	14 0 0
	800	25	*Isle of Thanet*	20 0 0	5 0 0	20 to 21
			Kendal £9100		8 15 0	
	300	10	Kenilworth	7 10 0		7 10 0
	400	5	Keswick	5 0 0	4 5 0	4 4 0
	100	25	Kettering	25 0 0	5 0 0	25 0 0
			Kiddermins. £10000		5 0 0	
			Kimbolton			
			Kingsbridge			
			King's Langley			
			Kingston-on-Thms			
			Kington, Hereford			
			Kirkby Lonsdale			
			Kirkham, Lanc.			
			Knighton			
			Knutsford			
			Lancaster			
			Llanelly £3000		5 0 0	
			Llandovery			
			Leamington Priors		6 0 0	
	160	10	Leatherhead	10 0 0		
			Ledbury			
			Leeds Old Comp.			
		25	old stk., £60,300	25 0 0	10 0 0	46 to 47
		25	new „ £23,775	25 0 0	6 0 0	29 to 30
		20	*Leeds New* £60,000	20 0 0	10 0 0	36 to 38
	3623	10	*Leicester*	10 0 0	7 0 0	15¾ to 16¼
			Leigh (Lancashire)			
	135	20	Leighton Buzzard	20 0 0	7 0 0	21 0 0
	400	10	Leominster	9 0 0	5 0 0	8 0 0
			Leyburn, Yorksh.			
	240	5	Liskeard	5 0 0	8 0 0	6 0 0
	330	25	Lewes	25 0 0	5 0 0	25 0 0
	320	25	*Lincoln*	25 0 0	10 0 0	48 0 0
			Leyland, Lancash.			
	240	5	Littlehampton	5 0 0	7 10 0	5 0 0
	250	20	Lichfield	20 0 0	10 0 0	35 0 0
			Liverpool United	100 0 0	10 0 0	182 to 186
			„ ¼ sh.	25 0 0	10 0 0	47¼ to 47½
	50	25	Langport	25 0 0	4 0 0	15 0 0
			London Comps.—			
	5000	10	Anglo-Romano	10 0 0	4 0 0	
	5000	20	British Provincial	20 0 0	7 0 0	22 to 24
		20	„ Prov., new	16 0 0	7 0 0	17 to 18
	4000	25	*Commercial*	25 0 0	6 0 0	25 to 27
	2000	25	„ new shares	2 10 0	6 0 0	par to 1pm
	12,000	50	*Chartered*	50 0 0	4 10 0	52 to 54
	6000	50	„ new shares	10 0 0	4 10 0	10 to 10½
	2000	150	*City of London*	150 0 0	3 0 0	96 to 100
	4000	50	*Equitable*	50 0 0	4 0 0	32 to 34
			„ deb. £47,600			
	12,000	20	European— (Amiens, Boulon., Caen, Havre, Nantes, & Rouen)	20 0 0	5 &bonus	14 to 15

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent per Ann	Price.
	£		£ s. d	£ s. d	£ s. d
15,000	10	*Gt.Cntl.Consumers* deb. £66,000	10 0 0	8 0 0	11 to 11½
8000	50	*Impl. Continental*—First capital (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam).....	42 0 0	6 11 0	40 to 45
7000	50	Second capital—(Aix la Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Marseilles, Toulouse Vienna)	41 0 0	10 7 0	65 to 70
	50	Third capital ...	43 10 0	9 4 0	65 to 67
13,000	50	*Imperial*	50 0 0	10 0	84 to 86
13,000	50	„ (new).....	10 0 0	10 0 0	25 to 26
		„ Bonds 130,000£	10 0 0	10 0 0	22 to 23½
4000	40	*Independent*	40 0 0	6 0 0	48 to 50
5000	50	*London*	50 0 0		5 0 0
1000	50	„ (red)	50 0 0		
2000	50	„ (blue).....	50 0 0	3 0 0	15 to 18
6000	25	„ (preference)	25 0 0	6 0 0	25 to 26
50,000	1	Oriental (Calcutta)	1 0 0		¾ to 1
9000	50	*Phœnix*	49 0 0	4 0 0	40 0 0
5000	20	*Ratcliff*	16 0 0	5 0 0	16 0 0
4000	25	*South Metrop.*	25 0 0	6 0 0	26 to 28
7000	10	*Surrey Consumers'*	10 0 0	8 0 0	10½ to 11
9000	50	United Genl. (Cork, Dublin, Limerick)	50 0 0	2 0 0	19½ to 20
6410	20	Western A shares	20 0 0	3 10 0	13 to 14
3500	20	„ B „	12 0 0	3 10 0	5 0 0
		Littleborough			
		Lostwithiel			
		Loughborough.....			
240	25	*Louth*.....	25 0 0	6 0 0	26 10 0
2500	10	*Lowestoft (&Water)*			
		Llangollen			
611	5	Ludlow Union.....	5 0 0	5 0 0	5 0 0
		Luton.....			
		Lutterworth.....			
63	20	Lyme Regis	20 0 0	4 0 0	20 0 0
120	25	Lymington	25 0 0	5 0 0	25 0 0
200	10	Malmesbury.....	10 0 0	2 10 0	5 15 0
		*Macclesfield*32,000£			
		Maidenhead.....			
300	50	*Maidstone*	50 0 0	10 0 0	90 0 0
160	40	Maldon	23 0 0	5 10 0	24 0 0
		Marlborough			
		Malton (New).....			
		Manningtree			
		Mansfield £5000		10 0 0	
150	10	Mansfield Wood-March .....[house	10 0 0		
		Margate(see I. of T.			
		Market Deeping ...			
		Market Drayton ...			
132	25	Market Harboro'	25 0 0	6 0 0	34 0 0
		Market Raisin.....			
		Market Weighton			
210	10	Marlow	10 0 0	5 0 0	10 0 0
370	10	Maryport	10 0 0	6 0 0	12 0 0
500	5	Matlock Baths.....	5 0 0		
		Melksham.....			
		Melton Mowbray ..			
		Merthyr Tydvil ...			
50	10	Mere	10 0 0		
		Middleton £9039		5 0 0	
		Midsummer Norton			
		Middlesboro'			
198	5	Mildenhall	5 0 0	5 0 0	5 0 0
700	10	Mitcham	10 0 0	10 0 0	14 10 0
650	5	Mold (and Water)	5 0 0	6 0 0	6 10 0
700	10	Monmouth	10 0 0	5 0 0	
		Monk Wearmouth			
150	10	Moreton in Marsh	10 0 0	3 10 0	
		Morley (nr. Leeds)			
		Mossley.....			
		Mottram			
220	16	Morpeth	16 0 0	5 0 0	17 10 0
		Nantwich			
		Neath.....			
183	10	Needham Market..	10 0 0	4 0 0	
		Newark..... £5000		10 0 0	
250	20	Newbury... [Union	20 0 0	5 0 0	20 0 0
13,000	5	Newcastle&Gatshd	5 0 0	8 0 0	7 12 6
		Do. un. Lyne£6200		4 0 0	
600	5	Newmarket	5 0 0	6 0 0	5 0 0
250	5	Newent	5 0 0		
		Newhaven(Sussex)			
		New Mills £2115			
		Newport, M. £11720		8 0 0	
320	50	*Newport, Isle of W.*	38 0 0		5 0 0
		Newport Pagnell ...			
		Newport, Salop ...			
		New Romney			
		Newton Abbot.....			
		Newton, Lanc.....			
		Newtown(Mntgom.			
		Northallerton			
120	10½	North Walsham ...	10 10 0	5 0 0	10 10 0
542	20	*Northampton*	18 0 0	10 0 0	31 0 0
		Northwich [400000			
		Norwich (see B. P.		7 0 0	
900	50	*Nottingham*	50 0 0	10 0 0	
900	50	New shares		10 0 0	
		Nuneaton			
		OakenGates(Salop)			
170	10	Oakham.....	10 0 0	4 10 0	8 10 0
		Oakhampton			
200	10	Odiham, Hants.....	10 0 0	4 0 0	10 0 0
		Olney			
658	10	*Ormskirk*	7 10 0	5 0 0	
		Ossett.....			
		Otley, Yorkshire...			
80	25	Oundle	25 0 0	7 0 0	25 0 0
120	150	*Oxford*	150 0 0	6 10 0	230 0 0
		Over Darwen £8000		5 0 0	
		Padiham			
		Padstow			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Pately Bridge, Yrk.			
		Peeltown (Man) ...			
		Pembroke			
250	20	Penrith	15 0 0	6 10 0	21 0 0
		Penryn			
		Penzance			
200	10	Petworth	10 0 0	9 10 0	14 15 0
320	5	Petersfield	5 0 0	4 0 0	5 0 0
		Pickering			
3000	10	*Plymouth*	10 0 0	8 0 0	18 0 0
		Pocklington			
		Pontefract.....			
		Pontypridd		4 0 0	
400	10	Poole	10 0 0	5 0 0	10 0 0
		Port Madoc.....			
600	50	*Portsea Island* ...	53 0 0	5 0 0	50 to 51
		Potton (Beds)			
400	10	Prescott.....	9 0 0	4 13 4	7 0 0
3000	20	*Preston*	20 0 0	10 0 0	44 0 0
		Pudsey £12,000		5 0 0	
		Pwllheli.....			
		Quordon & Monkst			
		Radcliff and Pilkington £9000		4 12 10	
		Ramsay, I. of Man			
		Ramsgate(see I. of T			
1000	10	*Reading*.....	10 0 0	4 0 0	7¼ to 8
500	20	*Reading Union* ...	20 0 0	4 0 0	16 0 0
		Redditch			
		Redruth.....			
		Reigate			
		Retford (East).....			
		Rhyl			
		Richmond(Surrey)			
400	5	Rickmansworth ...	5 0 0		5 0 0
180	10	Ringwood	10 0 0		10 0 0
		Ripon.....			
		Roches. & Chatham		6 0 0	
		Rochford [£20,000			
		Rockingham.....			
		Romford			
		Ross			
245	25	*Rotherham*	25 0 0	6 0 0	38 to 39
	12½	do. Half Shares	12 10 0	6 0 0	19 to 19½
		Royston.....			
		Rugby			
500	10	Rugeley.....	8 10 0	5 0 0	10 10 0
		Runcorn.... £11,000		7 10 0	
		Ruthin			
500	10	Ryde	10 0 0	6 0 0	12 0 0
		Romsey			
		Saddleworth.....			
185	22	Saffron Walden ...	22 0 0	4 0 0	19 0 0
		St. Alban's			
		St. Austel			
		St. Asaph			
		St. Colomb			
		St. Helen's £7500		7 10 0	
		St. Helier's (Jersey)			
		St. Ives, Hunting.			
		St. Ives, Cornwall			
250	10	St. Neot's	10 0 0	8 0 0	12 0 0
		St. Peter's Pt., Guer			
320	25	Salisbury.....[nsey	25 0 0	6 0 0	28 to 30
317	10	Sandbach	10 0 0	5 0 0	12 0 0
140	10	Saxmundham	10 0 0	5 0 0	10 0 0
		Scarborough.....	10 0 0		13 0 0
201	5	Sedburgh	5 0 0	2 10 0	4 15 0
300	16	Selby	16 0 0	5 0 0	16 0 0
		Settle.....			
290	10	Sevenoaks.....	10 0 0	4 0 0	10 0 0
250	10	Shaftesbury	10 0 0	3 0 0	9 0 0
540.0	25	*Sheffield United* ...	24 0 0	7 10 0	29 to 30
		Shelton, Pott.'s.B.P			
		Shepton Mallet ...			
600	5	Sherborne	5 6 0	5 6 0	5 0 0
2914	5	Shields (Tynemth.	5 0 0	5 0 0	5 17 6
		Shields (South) ...			
		Shiffnal, Salop			
1000	5	*Shipley*	5 0 0	6 0 0	7 10 0
150	10	Shipston-on-Stour	10 0 0	5 0 0	10 0 0
		Shoreham			
		Shrewsbury£10,000		7 0 0	
400	10	Skipton	10 0 0	4 0 0	11 0 0
		Sleaford			
250	10	Slough	10 0 0		
		Snaith			
		Soham			
400	5	Southam	5 0 0		
		Southend, Essex...			
300	5	Southwold [Bdge)	5 0 0	5 0 0	5 0 0
2000	5	South Essex (Lea			
		South Molton			
1000	50	*Southampton*	32 0 0	5 0 0	
220	10	Southwell	10 0 0	4 0 0	
		Sowerby, Yorksh.			
		Spennymoor (Dur.)			
		Spittal (Berwick-			
400	5	Spilsby [on Tweed)	5 0 0		
		Staindrop			
750	5	Stretford	5 0 0	6 0 0	5 0 0
		Stokesly.....			
		Stafford £10,000		5 0 0	
		Staines and Egham			
		Staley Bdg.£15,000		10 0 0	
225	50	*Stamford*	50 0 0	4 0 0	48 0 0
		Stevenage			
840	9½	*Stockton-on-Tees*	9 10 0	9 0 0	11 to 12
1000	10	Stoke-upon-Trent	10 0 0	7 0 0	12 15 0
500	10	„ new shares	8 0 0	7 0 0	10 10 0
		Stone, Stafford.....			
		Stoney Stratford ...			
		Stourbridge			
		Stowmarket.....			
150	20	Stratford-on-Avon	20 0 0	7 10 0	30 0 0
		Stroud			
169	10	Swaffham.....	10 0 0	5 0 0	5 10 0
		Swansea £9000			
		Sudbury.....			
		Sunderland, old....			
6400	5	*Sunderland*, new ..	5 0 0	6 0 0	6 12 6
200	10	Sutton Coldfield ...	10 0 0		
		Sutton (Surrey).....			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
250	10	Sutton-in-Ashfield	10 0 0	5 0 0	10 0 0
		Sutton Southcoates & Drypool (Hull).	20 0 0		23 to 24
		Swindon.....			
1000	10	Sydenham.....	10 0 0		
2800	5	*Taunton*.....	5 0 0	6 0 0	6 0 0
		Tadcaster			
		Tamworth.....			
		Tavistock.....			
200	5	Tenbury.....	5 0 0	5 0 0	5 0 0
		Tenby.....			
150	10	Tenterden.....	10 0 0	4 0 0	8 0 0
		Tetbury, Gloster..			
		Tewkesbury			
200	10	Thame	10 0 0	5 0 0	10 0 0
230	10	Thetford	10 0 0	6 0 0	10 10 0
		Thirsk			
		Thornbury.....			
		Thorne.....			
111	10	Tiverton	10 0 0	10 0 0	17 to 18
1141	5	Todmorden	5 0 0	5 0 0	6 0 0
600	2½	Topsham	2 10 0		3 0 0
		Torquay.....			
		Torrington, Devon			
		Totnes			
		Totnes Consumers			
4000	5	Tottenham	3 15 0	8 0 0	4 0 0
		Towcester.....			
		Town-Malling.....			
225	10	Tring	10 0 0	5 0 0	10 0 0
		Trowbridge (see			
75	50	Truro ...[Brit. P.)	50 0 0	5 0 0	
		Tunbridge.....			
		Tunbridge Wells...			
		Tuxford			
		Tyldesley, Lanca-			
		Ulverston ... [shire			
		Uppingham			
240	5	Upton-on-Severn	5 0 0	5 0 0	5 0 0
		Usk.....			
		Uttoxeter.....			
		Uxbridge			
		„ & Hillingdon			
		Ventnor .. [Cons.			
1000	25	*Wakefield*, old capl	25 0 0	8 0 0	35 0 0
1600	5	„ new „	5 0 0	8 0 0	7 0 0
		Wallasey.....			
300	10	Wallingford	10 0 0	5 0 0	8 0 0
994	10	Wandsworth.....	10 0 0	5 0 0	11 0 0
200	10	Wantage.....	9 0 0	5 0 0	10 10 0
	20	*Warrington* £23304	20 0 0	10 0 0	28 to 29
160	10	Wareham	10 0 0	3 10 0	8 0 0
		Warkworth			
120	25	Warminster	25 0 0	5 0 0	27 0 0
		Warth			
		Warwick £15,000		6 0 0	
		Watford.....			
111	25	Welchpool, Mntgy.	25 0 0	5 0 0	25 0 0
		Wellingborough ...			
100	24	Wellington, Salop	24 0 0	7 10 0	24 0 0
		Wellington, Somers			
160	25	*Wells, Smrst.* £5000	25 0 0	10 0 0	32 to 34
		Westbury.....			
		Weston-sup.-Mare			
2600	5	West Ham	5 0 0	5 0 0	5 0 0
		Wetherby			
		Whitby			
		Whitehaven			
		Whitstable			
250	10	Whittlesea.....	10 0 0	5 0 0	11 0 0
1216	10	*Wigan*	10 0 0	10 0 0	22 0 0
		Wigton (Cumberl.)			
		Willenhall.....			
		Wilton			
141	10	Winslow	10 0 0	5 0 0	10 0 0
240	10	Wimborne Minster	10 0 0		
600	10	Wimbledon	8 0 0		8 0 0
		Wincanton.....			
380	50	Winchester	50 0 0	5 0 0	50 0 0
900	12½	Windsor.....	12 10 0	10 0 0	23 0 0
		Witham.....			
		Witney.....			
4480	10	*Wolverhampton* ...	10 0 0	9 0 0	19 to 19½
4480	10	do. new shares do. deb. £10,000	1 5 0	9 0 0	4 5 0
200	10	Woburn.....	10 0 0	5 0 0	10 0 0
210	10	Wokingham	10 0 0	4 0 0	10 0 0
12	500	Woodbridge	500 0 0	5 0 0	
600	2½	Woodstock	2 10 0		2 15 0
		Wooler			
		Wotton-un.-Edge			
2900	10	*Worcester*	10 0 0	8 0 0	14 5 0
		Workington			
		Worksop & Radford			
200	10	Wirksworth	10 0 0	5 0 0	10 0 0
		Worthing.....			
		Wrexham			
1800	10	Woolwich Equitbl.	10 0 0	5 0 0	10 2 6
		Woolwich Consms.			
		Woolwich (North)			
		Wymondham.....			
795	20	Yarmouth.....	20 0 0	5 0 0	17 to 18
		Yeadon, near Leeds			
140	30	Yeovil.....	30 0 0	5 0 0	30 0 0
	5	*York Unid.* £55,000	5 0 0	6 0 0	7 10 0

SCOTLAND.

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
13,000	5	Aberdeen	3 11 0	7 0 0	4 11 6
420	10	Airdrie	10 0 0	7 10 0	12 10 0
		Alloa			
		Annan.....			
1300	1	Anstruther.....	1 0 0	7 10 0	1 2 0
160	20	Ardrossan.....	20 0 0	4 0 0	20 0 0
550	20	Arbroath	20 0 0	7 10 0	30 0 0
381	5	Auchterarder.....	5 0 0	7 10 0	7 0 0
750	2	Auchtermuchty	2 0 0	6 0 0	2 10 0
2666	5	Ayr, old	5 0 0	6 0 0	6 0 0
2500	2	Ditto, new.....	2 0 0	6 0 0	2 0 0
250	10	Banff.....	10 0 0	9 10 0	10 12 6
		Barrhead			
		Bathgate.....			
		Beith.....			
1000	1	Bervie	1 0 0		1 0 0

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Biggar			
739	5	Blairgowrie	5 0 0	8 0 0	7 0 0
400	6	Borrowstowness	6 0 0	5 0 0	8 0 0
540	5	Brechin	5 0 0	8 10 0	9 0 0
		Bridge of Allan			
2250	2	Broughty Ferry	2 0 0	6 0 0	2 2 0
		Burntisland			
		Campbelton			
		Carluke (Lanark)			
		Clackmannan			
1333	3	Coatbridge	3 0 0	10 0 0	4 0 0
		Coldstream			
		Collinsburgh			
		Comrie			
2744	1	Crieff	1 0 0		1 0 0
		Crail, Fife			
600	1	Cullen	1 0 0	5 0 0	15 0
		Cumbernauld			
900	6	Cumnock	6 0 0	5 0 0	6 0 0
600	5	Cupar Angus	5 0 0	7 0 0	7 3 0
250	10	Cupar Fife	10 0 0	7 10 0	15 0 0
		Dalkeith			
750	2	Denny			
		Dingwall			
		Dornoch			
500	1	Douglas	1 0 0	6 0 0	1 1 0
		Dufftown			
		Dumbarton			
400	70	Dumfries	70 0 0	5 0 0	70 0 0
		Dunbar			
560	2½	Dunblane	2 10 0	4 0 0	2 10 0
	23½	*Dundee*, old £29,687	23 15 0	8 8 0	30 10 0
8000	5	*Dundee, new*	5 0 0	4 6 0	3 17 6
860	10	Dunfermline	10 0 0	7 10 0	15 0 0
		Dunkeld			
1000	2	Dunoon	2 0 0		2 0 0
		Dunse			
250	5	Dysart	5 0 0	7 10 0	6 0 0
6000	25	*Edinburgh Gas Co.*	25 0 0	10 0 0	52 0 0
5480	25	„ *and Leith Co.*	25 0 0	10 0 0	53 0 0
		Elie			
455	11½	Elgin	11 10 0	6 0 0	11 10 0
		Falkirk, old			
		„ new			
		Falkland			
		Ferry Port on Craig			
600	1	Fochabers	1 0 0		1 0 0
1440	5	Forfar	5 0 0	7 10 0	7 19 0
		Fort William			
2000	16s.	Fraserburgh	16 0	5 0 0	16 0
500	5	Galashiels	5 0 0	10 0 0	9 10 0
		Garlieston			
		Gatehouse n. Fleet			
900	2½	Girvan	2 10 0	6 0 0	2 10 0
6000	25	*Glasgow*	25 0 0	10 0 0	52 10 0
15000	10	*Glasg. City & Suburb.*	10 0 0	10 0 0	20 10 0
		Grangemouth			
		Grahamston			
	8½	Haddington	8 10 0	7 10 0	12 10 0
1600	5	*Hamilton*	5 0 0	10 0 0	6 10 0
440	5	Hawick	5 0 0	7 10 0	7 10 0
300	5	Helensburgh	5 0 0	7 10 0	7 10 0
1312	1	Huntly	1 0 0	7 10 0	1 1 0
250	5	Inverary	5 0 0	10 0 0	6 12 6
425	1	Inverkeithing	1 0 0	5 0 0	1 0 0

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
1200	10	*Invern. Gas & Water*	10 0 0	7 0 0	14 0 0
2400	5	„ new shares	1 5 0	7 0 0	2 0 0
310	10	Irvine	10 0 0	10 0 0	15 0 0
		Jedburgh			
		Johnstone (Paisley)			
		Keith			
		Kelso		10 0 0	
		Kilmarnock			
339	5	Kincardine	5 0 0	2 10 0	4 5 6
		Kinghorn			
		Kingskettle, Fife			
		Kinross			
120	5	Kirkaldy	5 0 0	10 0 0	8 10 0
320	5	Kirkcudbright	5 0 0	5 0 0	5 0 0
1000	3	Kirkintulloch, near	3 0 0	5 0 0	3 0 0
227	5	Kirkwall... [Glasg.	5 0 0	5 0 0	4 10 0
518	5	Kirriemuir	5 0 0	6 0 0	
		Lanark			
		Largo, near Leven			
280	5	Largs	5 0 0	7 10 0	7 to 8
		Lasswade, n. Edin.			
177	5	Lauder	5 0 0	5 0 0	5 0 0
		Leith			
1879	1	Leslie, Fife	1 0 0	7 10 0	1 8 0
614	1	Lesmahago	1 0 0	6 0 0	1 0 0
1500	1	Leven	1 0 0	5 0 0	1 2 0
100	10	Linlithgow	10 0 0	7 10 0	15 0 0
		Linton, n. Nobleh.			
		Lochee, n. Dundee			
240	5	Lochgilphead	5 0 0	7 10 0	5 5 0
		Lochwinnock, near			
1200	1	Markinch. [Paisley	1 0 0	7 10 0	1 5 0
282	3	Mauchline [Dumf.	3 0 0	5 0 0	3 0 0
		Maxwell-town, n.			
423	5	Maybole, Ayrshire	5 0 0	4 10 0	5 0 0
		Maryhill, n. Glasg.			
373	2	Melrose	2 0 0	7 10 0	2 8 0
718	2	Mid & East Calder	2 0 0		2 0 0
200	5	Moffat	5 0 0	5 0 0	5 0 0
400	20	Montrose	20 0 0	10 0 0	35 0 0
		Musselburgh			
618	1	Nairn	1 0 0	5 0 0	1 0 0
		Neilston, n. Glasg.			
1056	1	Newmills, near Kilmarnock	1 0 0	5 0 0	1 0 0
		Newburgh, Fife			
		Newton-on-Ayre			
107	14½	Newton Stewart	14 10 0	5 0 0	14 10 0
		North Berwick, N B			
		North Queensferry			
245	5	Oban	5 0 0	7 10 0	5 0 0
194	5	Peebles	5 0 0	5 0 0	5 0 0
800	25	Perth	25 0 0	4 16 0	22 10 0
5		„ new	5 0 0	2 10 0	4 5 6
		Peterhead			
		Pittenweem			
2416	1	Polloksbaws, n Glsg	1 0 0	7 10 0	1 5 0
		Port Glasgow			
		Portobello, n. Edin.			
200	5	Prestonpans	5 0 0	6 0 0	5 0 0
1500	1½	Rutherglen, n Glasg	1 6 8	5 0 0	1 6 8
		Renfrew, n. Paisley			
		Saltcoats			
951	1	Sanquhar	1 0 0	5 0 0	1 0 0
		Selkirk			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		South Queensferry			
448	12	St. Andrew's	12 0 0	6 0 0	14 0 0
200	8	Stewarton	8 0 0	5 0 0	8 0 0
7330	2	Stirling	2 0 0	8 0 0	3 0 0
2500	1	Stonehaven	1 0 0	6 5 0	1 6 0
		Stonehouse, Lanrks.			
600	2½	Stornoway	2 10 0		2 15 0
420	5	Stranraer	5 0 0	7 10 0	5 to 5½
604	2	Strathaven, near	2 0 0	8 0 0	2 15 0
643	2½	Thurso... [Hamltn	2 10 0	4 0 0	2 10 0
		Tillicoultry, n. Allos			
800	1	Tranent	1 0 0	5 0 0	1 0 0
		Troon			
		Wick			
		Wigton [haven			
2051	1	Wemyss and Buck-	1 0 0	6 0 0	1 2 0
		IRELAND.			
		Ardee			
300	10	Armagh	10 0 0	10 0 0	20 0 0
		Ballinasloe			
		Bangor (co. Down)			
700	80	*Belfast*	80 0 0	7 10 0	80 0 0
51	5	Ballymena	5 0 0	10 0 0	
		Ballymoney			
150	5	Ballynahinch	5 0 0		5 0 0
		Castlebaney			
		Carrickfergus			
1100	5	Carlow	5 0 0		4 10 0
400	5	Cavan	5 0 0		5 0 0
		Cork (see Un. Gen.)			
		Cookstown			
1300	5	Clonmel Consumrs	5 0 0	5 0 0	5 0 0
		Drogheda			
19,000	10	*Dublin Consumers*	6 0 0	7 0 0	8 10 0
		Dublin Hibernian			
160	25	Dundalk [(see U.G.	25 0 0	5 0 0	25 0 0
200	10	Dungannon	10 0 0	7 10 0	12 10 0
871	5	*Downpatrick*	5 0 0	4 0 0	0 0
		Enniskillen			
		Enniscorthy			
240	25	Galway	25 0 0	10 0	37 10 0
		Keady			
400	10	Kilkenny	10 0 0	8 0 0	11 5 0
		Killarney			
		Larne			
		Limerick (see U.G.)			
1725	5	Limerick Consum.	5 0 0		
		Lismore			
600	15	Londonderry	15 0 0	6 13 4	21 0 0
		Louth			
500	7	Lisburn	7 0 0	7 10 0	8 5 0
520	10	Lurgan	6 0 0	6 0 0	6 0 0
		Mallow			
		Monaghan			
		Nenagh			
448	5	Newtownards	5 0 0	6 0 0	6 15 0
		Newtownlimavady			
750	20	Newry	20 0 0	5 0 0	20 0 0
425	5	Omagh	5 0 0	10 0 0	6 0 0
125	20	Portadown	20 0 0	5 0 0	20 0 0
		Portaferry			
900	10	Sligo	10 0 0	6 0 0	10 0 0
		Tralee			
		Waterford			

The Gas Works in the undermentioned towns belong to private individuals:—

Abergavenny.	Chester (Roodee).	Fermoy.	Huntingdon.	Oswestry.	Sheerness.	Ware. (2 works)
Barnet.	Chertsey.	Gainsborough.	Kelsedon	Parsonstown.	Sidmouth.	Wem.
Blaydon, n. Newcastle.	Crewkerne.	Goole.	Leiston (Suffolk).	Peterborough.	Sittingbourne.	Wexford.
Bridgenorth.	Dartmouth.	Harleston.	Lynn.	Pontypool.	Spalding.	Weymouth.
Brompton & Gillingham	Eltham.	Hertford.	New Ross.	Rye.	Tipperary.	Whitchurch (Salop).
Bungay.	Ely.	Holt.	Northfleet.	Sandwich.	Waltham Abbey.	Wisbeach.
Carnarvon.	Faraley.	Hunmanby.	Newport I. W. (new).	Seaham Harbour.		

The Gas Works belong to the Corporations, or to Commissioners acting under special acts of Parliament, in the following towns:—

Athlone	Coleraine.	Keighly.	Manchester.	Richmond (Yorkshire).	Southport	Trim (Meath).
Beverley.	Doncaster.	Kells (Meath)	Milton (Kent).	Rochdale.	Stockport	Walsall.
Blackpool.	Great Malvern.	Knaresborough.	Oldham.	Rothesay.	Strabane.	Wells (Norfolk).
Carlisle.	Greenock.	Leek.	Paisley.	Salford.	Teignmouth.	Youghall.
Cashel.	Haverfordwest.	Lytham (Lanc.)				

Price Current.

CASTINGS, per Ton.

Average Weight of Cast Iron Gas Pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow	Newcastle.	Wales.	Yorksh., Derbysh., and Staffrdsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	4 5 0	3 10 0	4 0 0	4 10 0	4 0 0
1½ and 2 inches Socket Pipes	8 0 0	7 0 0	7 10 0	7 15 0	7 10 0
2½ and 3 do. do.	7 10 0	6 15 0	7 5 6	7 10 0	7 5 0
4 and 5 do. do.	7 5 0	6 10 0	7 0 0	7 5 0	7 0 0
6 inches and upwards do.	7 10 0	6 5 0	6 10 0	7 0 0	6 10 6
Retorts, 1st fusion, hot blast	7 5 0	...	7 0 0	7 5 0	7 0 0
Do. 2nd fusion, cold blast	8 0 0	...	7 5 0	7 10 0	7 5 0
Tank Plates, ⅜ thick and above	7 10 0	6 10 0	7 0 0	7 5 0	7 0 0

COALS.

NEWCASTLE. Unscreened.	s.	d.	SCOTCH CANNEL.	per ton.
Whitwell Primrose	7	0 per ton.	Boghead ...at Leith	28 0 „
Pelton and Medomsley	7	6 „	Kirkness...best	23 0 „
Pelaw	7	9 „	Capeldrae, first quality	20 0 „
Burnhope, Eighton Moor, New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth [nel.	8	0 „	Ditto, second quality	12 6 „
Ramsay's Newcastle Can-	14	0 „	Lesmahago at Glasgow	25 0 „
			Ditto at Leith	27 6 „
			Arniston	22 0 „
			Wemyss ...(at the pits)	16 0 „
			Knightswood	18 0 „
			Methill	11 0 „

SUNDRIES.

Best Newcastle fire-bricks, 60s. per 1000	Foreign spelter ..... £23. 10s. per ton.
Ditto ditto clay ...12s. per ton.	English block tin ..... £129 „
Tough cake copper..... £126 „	Ditto ditto refined... 135 „
English pig lead .....£26 to £27 „	Banca ditto ..... 130 „
Welch bar iron in London, £9. 10s. „	Ground Manganese £6. 5s. to £6. 15s. „

WROUGHT IRON TUBING, subject to 35 per cent. Discount.

	2 inches.	1½ inch.	1¼ inch.	1 inch.	¾ inch.	½ inch.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent welded tubes, from 3 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto .... „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, springs, and elbows, wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets, caps, plugs, and nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	

FREIGHTS, per Ton.

Coastwise—Newcastle.		*Foreign.*	
Chatham & Roches.	6s. 6d	Boulogne	9s. 0d
Cork	10 6	Barcelona	30 0
Dover	7 0	Bordeaux	16 6
Dublin	11 0	Cadiz	17 0
Exeter Quay	9 6	Calais	9 0
Folkestone	7 0	Dieppe	11 0
Hastings	8 0	Genoa	32 0
London	6 9	Hamburg	10 6
Lowestoft & Yarmth	5 0	Havre	10 0
Lynn	6 0	Leghorn	20 0
Portsmouth	8 0	Lisbon	14 0
Plymouth	9 0	Rotterdam	10 0
Whitstable	6 9	Stettin	15 0
Weymouth	8 6	Trieste and Venice	37 0

WEST and GREGSON,

GAS-METER MANUFACTURERS, &c.
UNION-STREET, OLDHAM.

Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

JAMES FEATHERSTONE,

ENGINEER,
Manufacturer of GASHOLDERS, IRON ROOFS, and every description of Gas Apparatus.
ALLIANCE IRON WORKS,
CLAYTON, near MANCHESTER.

JOHN BENT,

MANUFACTURER OF GAS METERS,
283, BELL BAND ROAD,
BIRMINGHAM,
(Established 1830),

Begs respectfully to call the attention of Gas Companies, Engineers, &c., to his WET GAS METER, made upon the most improved principles, the most admirable materials, and warranted to register correctly.

TO GAS COMPANIES.

J. W. GRAZEBROOK,

75, OLD BROAD STREET, LONDON,

Having applications for New and Second-hand Gas Apparatus, would be obliged by those Companies having Apparatus to dispose of, to send particulars. And Companies requiring Apparatus are solicited to apply.

PIPES, RETORTS, TANKS, GASHOLDERS, &c. on Shortest Notice.
STOURBRIDGE and NEWCASTLE FIRE GOODS.
CONTRACTS TAKEN.

GEORGE CUTLER,

GASHOLDER MAKER,
No. 8, WENLOCK-ROAD, CITY-ROAD,
LONDON.

Contracts for Tanks, Gasholders, Roofs, Purifiers, and all descriptions of Gas Apparatus executed on the most reasonable terms. Improved Slide Valves, Steam, and Range Boilers, and Smiths' Work, of the best materials and workmanship.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,
DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

ROBERT MACLAREN,

(Successor to Andrew Liddle and Co.,)
IRONFOUNDER AND GAS ENGINEER.

Manufacturer of Patent Iron Tubing, Block Tin, Lead, and Composition Tubing. Cast-iron Gas and Water Pipes of all sizes, and every description of Gas Apparatus.
GLOBE FOUNDRY, GLASGOW.

WHITWELL PRIMROSE GAS COAL.

—These excellent Gas Coals are wrought from the HUTTON SEAM *only*, and can be shipped either at the South Dock, SUNDERLAND; or Old Harbour, HARTLEPOOL; or Brandling Drops, SOUTH SHIELDS; on application to the WHITWELL COAL COMPANY, Sunderland.

PATENT FIRE-CLAY RETORTS.—

O. BROTHERS and COMPANY, Manufacturers of O. Brothers's Patent, beg to state that these Retorts, being made in one entire operation, and in one piece, of any required shape, length, breadth, and height, are not liable to cracks and fissures, of which there is a just and general complaint; and consequently superior to, and cheaper than, any hitherto manufactured.

GREAT REDUCTION IN PRICES—30 per cent. cheaper than any other Clay Retorts manufactured.

Shape.	Sizes.	Length.	Thickness.	Price at Railway Station, Blackburn.	Price per foot run, of any required length, at Blackburn.
		feet.	in.	£ s. d.	s. d.
Dee.....	12 in. by 12 in.	8	2½	2 0 0	5 0
,, ...	14 in. by 12 in.	8	2½	2 4 0	5 6
,, ...	16 in. by 13 in.	8	2½	2 10 0	6 3
,, ...	18 in. by 14 in.	8	2½	2 16 0	7 0
,, ...	19 in. by 13 in.	8	2½	2 16 0	7 0
,, ...	20 in. by 14 in.	9	3½	3 7 6	7 6
,, ...	24 in. by 15 in.	8	2½	3 12 0	9 0
Round.....	15 in. by 15 in.	8	2½	2 10 0	6 3
,, ...	15 in. by 15 in.	10	2½	3 2 6	6 3
,, ...	18 in. by 18 in.	8	2½	3 0 0	7 6
Oval Retort	18 in. by 12 in.	8	2½	3 0 0	7 6

All other sizes and shapes in proportion, to order.
References and further particulars may be obtained on application to the Patentee, Gas Works, BLACKBURN.

CLEGG ON COAL GAS.

Now ready, in demy 4to., with numerous Engravings and Woodcuts, price £1. 11s. 6d., bound in cloth, the Second Edition, considerably enlarged, of

A PRACTICAL TREATISE
ON THE
MANUFACTURE AND DISTRIBUTION OF COAL GAS;
ITS INTRODUCTION AND PROGRESSIVE DEVELOPMENT.

Illustrated by Engravings from Working Drawings, with General Estimates.

BY SAMUEL CLEGG, JUN., M. INST. C.E., F.G.S.

LONDON: JOHN WEALE, 59, HIGH HOLBORN.

RUTTER ON GAS LIGHTING.

Hundred and Thirtieth Thousand.

ADVANTAGES
OF
GAS IN PRIVATE HOUSES.
BY J. O. N. RUTTER, F.R.A.S.

A New Edition, Revised in 1855.

Price:—Per 1000 copies, £5; 500 ditto, £3. 15s.; any smaller number, 12s. per 100.

Twenty-sixth Thousand.

GAS IN DWELLING-HOUSES:
ITS USES, CONVENIENCES, AND ECONOMY.

Price:—1000 copies, £3. 3s.; 500 ditto, £1. 15s.; any smaller number, 7s. 6d. per 100.

A single copy of either of the above-mentioned books will be sent, on application to the Author ONLY, by payment of the postage (1d.).

These little books are written in a simple and familiar style; showing the comfort, convenience, safety, and economy of Gas. They are intended for gratuitous distribution by Gas Companies. They have already done good service, and the author is anxious still further to extend their usefulness.

The present high prices of tallow and oil are favourable to a more general adoption of gas in private houses. Let its advantages, as yielding a pure, cheap, and healthful light, be properly explained, and there will be no difficulty in getting over a few old-fashioned prejudices. Those persons who have experienced the benfits of gas-light never go back to candles or lamps.

JOHN W. PARKER AND SON,
WEST STRAND, LONDON.
Black Rock, Brighton.

12,950 CUBIC FEET OF GAS,

Specific Gravity ·820, produced from a ton of BATHVILLE CANNEL COAL, a Coal identical with that named Bathgate, Boghead and Torbane Mineral.

JAMES LAWRIE and CO.

COUSIN LANE, UPPER THAMES STREET,
SOLE AGENTS.

Messrs. LAWRIE and Co. are also Sole Agents for the excellent KNIGHTSWOOD CANNEL, used by London Companies, and are Makers of RETORTS, Clay and Iron; SOCKET PIPES; and all kinds of CASTINGS.

SHEARS AND SONS'

PATENT DRY GAS METERS

Are supplied to Gas Companies and the Public as the best and simplest Dry Gas Meters in use. They are acknowledged to be of first-rate workmanship and accuracy of registration.—Shears and Sons continue to supply these Meters on the most favourable terms; and they also manufacture Wet Gas Meters, to which they apply their Patent Indices.

BANKSIDE, LONDON.

ADDISON POTTER,

WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

WHITEHOUSE and CO.,

GLOBE PATENT TUBE WORKS,
WEDNESBURY,

Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.
Orders promptly executed.

IMPROVED
SELF-LUBRICATING GAS VALVES,

Used in nearly one hundred gas works in Great Britain and the Continent, and are esteemed for their strength, superior workmanship, non-liability to damage, never sticking, oiling themselves, always working free in tar, lime, or gas, never falling down, and their very legible index of opening of valve—advantages only possessed by these valves.

SELF-REGISTERING GAUGE COLUMN
To regulate the pressure in the Street Mains, showing at one glance the valve on the facing, area of the opening, size of pipe the gas passing will fill, and the pressure on the works and on the mains. This supersedes the necessity of the expense of a governor for small works, and should be placed on the by-pass, where a governor is used in large works. IT IS NEXT TO IMPOSSIBLE FOR THE VALVE MAN TO PUT A TOWN IN DARKNESS WITH THIS APPARATUS, and is a great ornament to the Valve-room.

IMPROVED ANNULAR CONDENSER.
Ensures perfect condensation with smallest weight of iron, and standing on the smallest space, the whole of the parts being instantly accessible. They are in use in various Gas Works, small and large, and passing 20,000 to 600,000 cubic feet per 24 hours.

DRY LIME AND OXIDE OF IRON PURIFIERS.
Perfect simplicity of action and improved Sieves, which are strong and very lasting, and the wires, when worn out, may be replaced in an hour and a half by any handy man in a gas work. The undersigned have made them, and have patterns for every size from 3 feet to 18 feet square.

GASHOLDERS, SCRUBBERS, &c.
CHARLES WALKER AND SONS,
LITTLE SUTTON-STREET, LONDON, AND MIDLAND IRON WORKS, TIPTON, STAFFORDSHIRE.

Applications for Prices, &c., to be addressed to their London Office, as above.

PATENT FLEXIBLE GAS TUBING.

JAMES LYNE HANCOCK'S

Vulcanized Indiarubber Hose Pipes and Tubing. Manufactory (and Warehouse), Goswell-mews, Goswell-road, London.

Gas Companies, Engineers, Gas Fitters, and the Trade generally, are respectfully informed this Tubing is now manufactured to any size, from ¼ inch bore and upwards, in 100-feet lengths, and perfectly cylindrical, either with or without a spiral wire inside.

VULCANIZED GLAZED FLEXIBLE TUBING, from ¼ inch up to 1 inch diameter, made in 24-feet lengths; or, covered with silk or worsted, up to 100 feet.

VULCANIZED HOSE, for FIRE ENGINES, BREWERS' USE, and for standing great pressures, (Rubber and Cloth combined), made to any length or size to fit the necessary screws, &c.

VULCANIZED INDIARUBBER AIR-TIGHT BAGS, made any size, for Gas Mains, with flexible tubes attached, and fitted with stopcocks complete.

CARTER'S PATENT SAFETY GAS VALVES.

THOMAS LAMBERT and SON,

PATENTEES AND MANUFACTURERS,
SHORT STREET, NEW CUT, BLACKFRIARS, LONDON.

The Bank of England is fitted entirely with these Valves, from the smallest branch to the largest main pipe.

The following, among numerous testimonials, will be found very satisfactory:—

"The British Gaslight Company's Office, No. 105, Broad-street, Ratcliff, London, June 10, 1846.

"Gentlemen,—In reply to your inquiry, I have to state that 'Carter's Patent Gas Valve' has been used by this company and by the fitters of the district extensively for seven years past. It was adopted to obviate the inconvenience of setting fast, so prevalent with the conical metal plug-cocks, and has been found to answer the purpose intended.

"I have recommended its use in several provincial towns with which I am professionally connected, and have not received any complaint of its having failed in any respect of performing satisfactorily all that is required of it.—I am, gentlemen, yours respectfully,
"GEDDIE PEARSE.

"Messrs. Lambert and Son, Lambeth."

ALEXANDER WRIGHT,

GAS ENGINEER, MANUFACTURER OF GAS METERS, GOVERNORS,
AND ALL DESCRIPTION OF GAS APPARATUS,
55, MILLBANK STREET, WESTMINSTER.
CONSUMERS' METERS at the List Price, with a Liberal Discount to Wholesale Purchasers.

THOMPSON'S BROMINE TEST, £1. 1s.
Bromine, 3s. per Ounce.

BISULPHURET OF CARBON TEST, £2. 2s.

APPARATUS FOR DETERMINING THE
HEATING POWER of SAMPLES of COAL and OTHER DESCRIPTIONS of FUEL, £5. 5s.,
INVENTED BY LEWIS THOMPSON, Esq., M.R.C.S.

REGISTERING PRESSURE GAUGE,
Net Price, £8. Glass Shade, 10s. extra.
STATION METERS, PRESSURE GAUGES, PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, &C.

FIRE-CLAY RETORTS.

JOHN SWARBRICK,

MANUFACTURER OF PATENT COMPOSITION CLAY RETORTS,
FIRE BRICKS OF EVERY DESCRIPTION, SHAPE, AND SIZE, &c. &c.
HIGHER EANAM, BLACKBURN, LANCASHIRE.

These RETORTS are generally used in the Gas-works of Preston, Accrington, Bury, Heywood, Middleton, Rochdale, Ratcliffe; the Mills of Messrs. Horrocks, Miller, and Co., Preston, &c. &c., and are unequalled in having afforded general satisfaction to those who have given these Retorts a trial.
To meet the increasing demand, the Works at Little Harwood have been greatly enlarged; and Gas Engineers who may favour with an Order may rely with confidence on their being promptly supplied with an article not to be surpassed in finish or durability.

PRICES MODERATE.

TO GAS COMPANIES, GAS PROPRIETORS, AND GAS ENGINEERS.

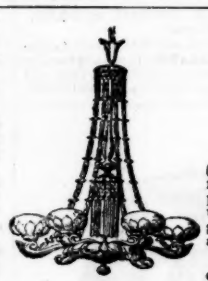
JOHN VICKARY

begs to call the attention of the above to his improved METALLIC CASE GAS-METER, an improvement which has met with entire approbation from the various Gas Companies and Engineers to whom he has introduced it, and acknowledged to be the greatest improvement that has been made since the year 1832; at which period a metal was introduced for the construction of the Drum, Syphon, and Float, capable of resisting any impurities arising from either gas or water, which has been found to answer every expectation; as, in repair, Drums of the above date are found in perfect and good condition, when the Outer Case, Valve-box, Inlet-pipe, &c., are quite destroyed and entirely past repair.
J. V. has introduced a coating or lining of the above metal in the Outer Case, Valve-box, Inlet-pipe, &c., thereby rendering the whole as durable as the Drum, as not a particle of tin plate is exposed to the action of either water or gas; and preventing the possibility of gas passing above the water line through the front into the body of the Case to the outlet unregistered, which frequently occurs. When the Meter has been in use for any length of time it is generally found that rust or decay takes place *above* rather than under the water line, which is only discovered when they need repair. Also the Inlet-pipe and Valve-box are generally found quite decayed, which cannot happen in the above improvement.
J. V. feels confident that the above will be found a most desirable and perfect instrument, as it contains all other improvements of utility that have been introduced up to the present time.
The most strict attention is given to the workmanship as well as the registration of every Meter, to render them perfectly accurate.
Station Meters, Governors, &c., made on the shortest notice, as well as Gas Cooking Apparatus of every description, Gas Baths, &c.
Meters sent at the lowest London prices.

Carriage paid to any part of England.

WEST OF ENGLAND GAS METER AND GENERAL GAS APPARATUS MANUFACTORY, 84, FORE STREET, EXETER.

GAS EXPLOSIONS Prevented by using the Tubes and Fittings Manufactured by
JOHN RUSSELL and CO.,
whose Goods are all well Tested and Warranted.
The first manufacturers of Lapwelded Flues for Locomotive and Marine Boilers.
The FIRST PRIZE of the Paris Great Exhibition was awarded to them for Gas Tubes and Fittings, and Tubes for Marine and Locomotive Boilers.
John Russell and Co. are the Original Manufacturers, and at present the Holders, of the Patent for Tubes.
WAREHOUSES,
69, UPPER THAMES STREET, LONDON.
MANUFACTORY,
THE OLD TUBE WORKS, CHURCH HILL,
WEDNESBURY, STAFFORDSHIRE.



F. & C. OSLER,

44, OXFORD-STREET, LONDON;
Manufactory—Broad-street, Birmingham,
MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.
ELEGANT CRYSTAL GLASS CHANDELIERS, FOR GAS
(Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.
THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

HULETT AND CO., 55 AND 56, HIGH HOLBORN,

PATENTEES and MANUFACTURERS of the NATIONAL GAS METER,

Beg to inform the Proprietors of Gas Companies, and the Trade generally, that, having completed their new Gas Meter Manufactory, they are now enabled to supply, with despatch, a very superior article, and can confidently warrant the same to be equal in quality and workmanship to any Gas Meter ever made. Manufacturers of

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, PILLARS, BRACKETS, PENDANTS,
AND EVERY ARTICLE CONNECTED WITH
GAS FITTINGS.
GAS COOKING APPARATUS, IMPROVED ALBERT,
AND EVERY DESCRIPTION OF
SHADOWLESS GAS BURNERS, UNION JETS, BATSWINGS, &c. &c.; CAST AND WROUGHT IRON PIPE; COPPER, TIN, BRASS, and COMPOSITION TUBING.
D. HULETT'S IMPROVED SERVICE CLEANSER,
by which Mains, Service Pipes, and the interior Fittings of a House, may be cleaned out in a few minutes. Price 60s. net.
Sole Manufacturers of Church and Mann's Improved Photometer.

Large Pattern Books, with every description of Gas Fittings and Chandeliers, &c., with complete Book of Prices, price 10s.
Price Lists sent free, on receipt of envelope, addressed and enclosing two postage stamps.

London: Printed by THOMAS GREAVES BABLOW, of 3, Parliament Street, in the parish of St. Margaret, Westminster (at the office of Joseph Clayton, 10, Crane Court, Fleet Street); and published by WILLIAM BOUGHTON KING, of No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, March 18, 1856.